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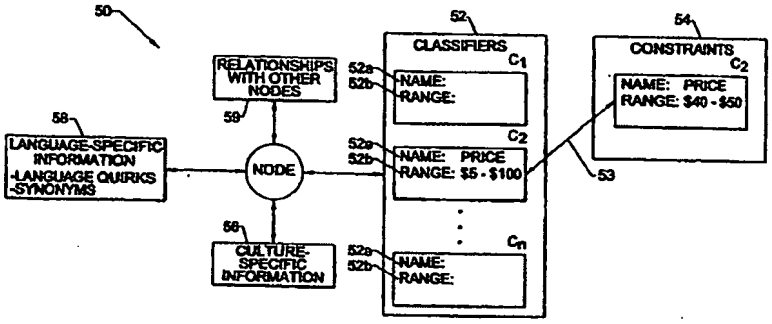
(54) Title: SYSTEMS, METHODS AND COMPUTER PROGRAM PRODUCTS FOR PERFORMING MULTI-LINGUAL, MULTI-CULTURAL SEARCHES, COMPARISONS, AND PURCHASES OF PRODUCTS OFFERED FOR SALE AT MULTIPLE WEB SITES ON THE INTERNET



(57) Abstract: Systems, methods, and computer program products for performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered for sale at one or more Web sites on a computer network are provided. An intermediary Web site is configured to receive product search requests from users accessing the intermediary Web site via various types of client devices and via various languages. The intermediary Web site searches for nodes of a stored data structure that satisfy a received search request and sends results of the search to the requesting user. Search results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request. A data structure is maintained by an intermediary and includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network. Each node may include language-specific information and culture-specific information associated therewith. Search results sent to requesting users may also include one or more user-manipulatable slider widgets that are configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation.

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SYSTEMS, METHODS AND COMPUTER PROGRAM PRODUCTS FOR PERFORMING MULTI-LINGUAL, MULTI-CULTURAL SEARCHES, COMPARISONS, AND PURCHASES OF PRODUCTS OFFERED FOR SALE AT MULTIPLE WEB SITES ON THE INTERNET

Field of the Invention

The present invention relates generally to commerce and, more particularly, to electronic commerce conducted via computer networks.

Related Applications

This application claims the benefit of U.S. Provisional Application No. 60/149,351, filed August 18, 1999.

Background of the Invention

The Internet has gained broad recognition and acceptance as a viable medium for communicating and for conducting business. The World-Wide Web (Web) was created in the early 1990's, and is comprised of server-hosting computers (Web servers) connected to the Internet that have hypertext

documents (referred to as Web pages) stored therewithin. Web pages are accessible by client programs (*e.g.*, Web browsers) utilizing the Hypertext Transfer Protocol (HTTP) via a Transmission Control Protocol/Internet Protocol (TCP/IP) connection between a client-hosting device and a server-hosting device.

Electronic commerce (e-commerce) refers to the buying and selling of products and services via the Web. Exemplary products include items (*e.g.*, music) that are delivered electronically to the purchaser over the Internet and items (*e.g.*, books) that are delivered through conventional distribution channels (*e.g.*, a common carrier). Typically, when a user has selected one or more items to be purchased from an e-commerce Web site, a server computer system prompts the user for purchaser-specific information in order to complete the financial transaction. This purchaser-specific order information may include the purchaser's name, the purchaser's credit card number, and a shipping address for the order. The server computer system then typically confirms the order by sending a confirming Web page to the client computer system and schedules shipment of the items.

The sheer size of the Web may be an impediment to e-commerce, particularly for users trying to locate and compare products offered for sale at various Web sites. Moreover, product information may not be stored or presented in a consistent, homogenous format across the Web. For example, one traditional e-commerce approach referred to as "menu browsing" requires users to "drill down" through product listings to obtain

product information.

Figs. 1A-1D illustrate an exemplary menu browsing Web site that requires users to drill down through various levels of information. A user starting at the home page 10 of Fig. 1A, and desiring to locate a particular type of men's surfer shirt, clicks on the link labeled "Men's" 12. The Web page 14 of Fig. 1B is displayed in response to activation of the "Men's link 12 of Fig. 1A. The user must then click on the link labeled "Shirts & Polos" 16. The Web page 18 of Fig. 1C is displayed in response and contains a link for the desired surfer shirt. Upon clicking on the link labeled "Surfer Shirt" 20, the Web page 22 that displays information about the desired shirt is displayed (Fig. 1D).

Another traditional approach implemented by conventional e-commerce Web sites requires users to conduct keyword searches to locate products and product information. Fig. 2A illustrates a Web page 24 that displays an exemplary keyword search interface 26 for locating music. In the illustrated Web page 24, a user has entered search keywords for music composed by Beethoven and performed by the London Symphony Orchestra. Fig. 2B illustrates a Web page 28 that displays the results of the search keywords entered in the Web page 24 of Fig. 2A. As illustrated, the search located 135 items that satisfied the terms of the search.

Unfortunately, browsing long lists of search results (as illustrated in Fig. 2B) may be undesirable by many Web users. Another drawback associated with keyword searches is that results returned from keyword searches may be returned in

virtually any order. For example, items located in the illustrated search for music composed by Beethoven and performed by the London Symphony Orchestra (**Figs. 2A** and **2B**) may be randomly displayed to the user. However, a user may find it desirable for the search results to be displayed in some order, such as by price or by date of performance.

Another drawback associated with keyword searches is that context associated with a search may be lost. For example, a search conducted using the keyword "bag" may return products related to bags of sugar, duffel bags, golf bags, tote bags, and the like. As a result, a user desiring to locate information on "hand bags" may be confronted with a large and unwieldy number of results to peruse after conducting a traditional keyword search of conventional e-commerce Web sites.

Furthermore, layouts and designs of Web sites may vary. For example, one Web site may allow a user to refine a keyword search by passing through different levels of a product hierarchy. Another Web site may require the use of a search engine to locate products. As such, users often have to learn how to best search for information at each individual Web site. As a result, searching for products over the Web may be difficult and inefficient.

According to recent studies, about 96% of all e-commerce Web sites utilize the English language, although only about 7 countries actually use English as a primary language. With the rapid growth of the Web, it is predicted that by the year 2003 65% of all Web users will come from countries

other than the United States. As such, it is anticipated that there will be rapid growth in Web sites using languages other than English. Unfortunately, from an e-commerce standpoint, it may be difficult to search for and compare products offered for sale at Web sites using different languages. For example, it may be difficult for a person fluent only in English to search for and compare products from Web sites in non-English languages.

Summary of the Invention

In view of the above discussion, the present invention provides systems, methods, and computer program products for locating products offered for sale at one or more Web sites on a computer network. According to an embodiment of the present invention, a Web site of an intermediary is utilized for performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites on a computer network, such as the Internet. The intermediary Web site is configured to receive product search requests from users accessing the intermediary Web site via various types of client devices and using various languages. The intermediary Web site searches the nodes of a stored data structure for products that satisfy a received search request and sends results of the search to the requesting user. Search results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

A data structure according to an

embodiment of the present invention is maintained by an intermediary and includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network. At least one classifier is associated with one or more of the nodes. Each classifier includes a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute. Each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node.

Each node may include language-specific information associated therewith, wherein the language-specific information includes information about a product category or subcategory relative to one or more human languages. Also, each node may include culture-specific information associated with a node, wherein the culture-specific information comprises information about a product category or sub-category relative to one or more human cultures. For example, the term "football" to Americans may mean something different than the term "football" to Europeans.

Search results sent to requesting users may also include one or more user-manipulatable slider widgets. Slider widgets according to embodiments of the present invention are configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation. For example, a slider widget may be configured to allow a user to change

displayed results based upon sales price of products in a list. Slider widgets according to embodiments of the present invention may allow users to instantly refine and redirect searches, even in multiple languages.

According to another embodiment of the present invention, an intermediary Web site is configured to execute transactions with individual Web sites on behalf of a user and without requiring a user to communicate with the individual Web sites.

According to another embodiment of the present invention, an intermediary Web site is configured to retrieve information about one or more products offered for sale at multiple Web sites on a computer network. A Web site on a computer network from which product information is to be extracted is initially selected. A node from a data structure is selected and a search request that includes various information from the selected node is created. The selected Web site is then searched for products offered for sale that satisfy the search request. Information about each product for sale at the selected Web site that satisfies the search request is retrieved and stored.

According to other embodiments of the present invention, retrieved information associated with each product that satisfies a search request may be assigned a display priority that determines a priority in which information about a product is displayed to a user.

Embodiments of the present invention allow users to search, compare and purchase merchandise across multiple languages. Moreover, embodiments of the present invention allow side-by-side

product/price comparisons on single screen. In addition, purchase transactions from multiple Web sites can be simplified via a unified check-out procedure according to embodiments of the present invention.

As such, embodiments of the present invention may overcome many of the limitations of conventional e-commerce Web sites that require shoppers to search for available products via keywords and to the peruse long lists of search results. Moreover, embodiments of the present invention may provide an advantageous alternative to the rigid model of navigation utilized by many conventional Web sites wherein shoppers are required to drill down through multiple layers of Web pages. The present invention may also facilitate aggregating search results into a format easier to use by shoppers.

Brief Description of the Drawings

Figs. 1A-1D illustrate a conventional e-commerce Web site utilizing menu browsing and that requires users to drill down through various levels of Web pages and information.

Fig. 2A illustrates a Web page from a conventional e-commerce Web site that displays an exemplary keyword search interface for locating music.

Fig. 2B illustrates a Web page from the e-commerce Web site of **Fig. 2A** that displays the results of the search keywords entered in the Web page of **Fig. 2A**.

Fig. 3 is a block diagram that illustrates a Web site of an intermediary for performing multi-

lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites on a computer network, according to embodiments of the present invention.

Fig. 4 is a block diagram that illustrates an exemplary node from a data structure according to embodiments of the present invention.

Fig. 5 is a block diagram that illustrates a parent node and a child node related thereto, according to an embodiment of the present invention.

Fig. 6 is a block diagram that illustrates a data structure having a plurality of nodes in hierarchical order wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network, according to an embodiment of the present invention.

Fig. 7 is a flow chart illustrating operations for retrieving information about one or more products offered for sale at Web sites on a computer network, according to embodiments of the present invention.

Fig. 8 is a block diagram that illustrates the structure of three tables of a database for storing data structures according to embodiments of the present invention.

Fig. 9 is a flow chart illustrating operations for locating and purchasing products offered for sale at one or more Web sites on a computer network, according to embodiments of the present invention.

Fig. 10 is a user interface containing search results from a user request to an intermediary Web site and also containing a

plurality of slider widgets for dynamically modifying the search results, according to an embodiment of the present invention.

Fig. 11 is a user interface according to an embodiment of the present invention through which a user can enter a product search for products offered for sale by Web sites on a computer network.

Fig. 12 is a user interface containing search results from a search initiated in the user interface of **Fig. 11**, according to an embodiment of the present invention.

Fig. 13 is a user interface that displays products for sale by various Web sites that were selected by a user in accordance with the present invention, and through which the user can direct the intermediary to complete purchasing transactions with the various Web sites on behalf of the user.

Detailed Description of the Invention

The present invention now is described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

As will be appreciated by one of skill in the art, the present invention may be embodied as methods, data processing systems, and/or computer program products. Accordingly, the present invention

may take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment combining software and hardware aspects. Furthermore, the present invention may take the form of a computer program product on a computer-usable storage medium having computer-usable program code embodied in the medium. Any suitable computer readable medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

Computer program code for carrying out operations of the present invention may be written in an object oriented programming language such as JAVA®, Smalltalk or C++. The computer program code for carrying out operations of the present invention may also be written in conventional procedural programming languages, such as "C", JavaScript, Visual Basic, TSQL, Perl, or in various other programming languages. Software embodiments of the present invention do not depend on implementation with a particular programming language. Portions of the program code may execute entirely on one or more data processing systems utilized by an intermediary Web site.

Program code for carrying out aspects of the present invention may execute entirely on one or more servers, or it may execute partly on a server and partly on a client within a client device (*i.e.*, a user's Web client), or as a proxy server at an intermediate point in a communications network. In the latter scenario, a client device may be connected to a server through a LAN or a WAN (*e.g.*, an intranet), or the connection may be made through the Internet (*e.g.*, via an Internet Service

Provider). It is understood that the present invention is not TCP/IP-specific or Internet-specific. The present invention may be embodied using various protocols over various types of computer networks.

The present invention is described below with reference to block diagrams and/or flowchart illustrations of methods, apparatus (systems) and computer program products according to embodiments of the invention. It is understood that each block of the block diagrams and/or flowchart illustrations, and combinations of blocks in the block diagrams and/or flowchart illustrations, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions specified in the block diagrams and/or flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function specified in the block diagrams and/or flowchart block or blocks.

The computer program instructions may also be loaded onto a computer or other programmable data

processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the block diagrams and/or flowchart block or blocks.

A Web site is conventionally a related collection of Web files that includes a beginning file called a "home" page. From the home page, a visitor can access other files and applications at the Web site. A large Web site may utilize a number of servers, which may or may not be different and may or may not be geographically-dispersed. For example, the Web site of the International Business Machines Corporation (www.ibm.com) consists of thousands of Web pages and files spread out over multiple Web servers in locations world-wide.

A Web server (also referred to as an HTTP server) is a computer program that utilizes HTTP to serve files that form Web pages to Web clients. Exemplary Web servers are International Business Machines Corporation's family of Lotus Domino® servers, the Apache server (available from www.apache.org), and Microsoft's Internet Information Server (IIS), available from Microsoft Corporation, Redmond, Washington.

A Web client is a requesting program that also utilizes HTTP. A browser is an exemplary Web client for use in requesting Web pages and files from Web servers. A Web server waits for a Web client, such as a browser, to open a connection and

to request a specific Web page or application. The Web server then sends a copy of the requested item to the Web client, closes the connection with the Web client, and waits for the next connection.

HTTP allows a browser to request a specific item, which a Web server then returns and the browser renders. To ensure that browsers and Web servers can interoperate unambiguously, HTTP defines the exact format of requests (HTTP requests) sent from a browser to a Web server as well as the format of responses (HTTP responses) that the Web server returns to the browser. Exemplary browsers include Netscape Navigator® (America Online, Inc., Dulles, VA) and Internet Explorer® (Microsoft Corporation, Redmond, WA). Browsers typically provide a graphical user interface for retrieving and viewing Web pages, applications, and other resources served by Web servers.

As is known to those skilled in this art, a Web page is conventionally formatted via a standard page description language such as HyperText Markup Language (HTML), which typically contains text and can reference graphics, sound, animation, and video data. HTML provides for basic document formatting and allows a Web content provider to specify anchors or hypertext links (typically manifested as highlighted text) to other servers. When a user selects (*i.e.*, activates) a particular hypertext link, a browser running on the user's client device reads and interprets an address, called a Uniform Resource Locator (URL) associated with the hypertext link, connects the browser with a Web server at that address, and makes a request (*e.g.*, an HTTP request) for the file identified in

the hypertext link. The Web server then sends the requested file to the client device which the browser interprets and renders within a display screen.

Referring now to **Fig. 3**, a Web site **30** of an intermediary for use in performing multi-lingual, multi-cultural searches, comparisons, and purchases of products offered from sale at a plurality of Web sites **32** on a computer network **34**, such as the Internet, according to embodiments of the present invention, is illustrated. The illustrated intermediary Web site **30** is configured to receive product search requests from users (*e.g.*, subscribers and/or visitors) accessing the intermediary Web site via various types of client devices **36**. The intermediary Web site **30** searches the nodes of a stored data structure for products that satisfy a received search request and sends results of the search to the requesting user. Search results may include lists of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

The illustrated intermediary Web site **30** includes a Web server **40** and a database **42**. Although a single Web server **40** and a single database **42** are illustrated, it is understood that multiple Web servers and/or multiple databases may be utilized to perform the various functions of the intermediary Web site **30**. Moreover, the functionality of the Web server **40** and the database **42** may be integrated together.

The Web server **40** is the "front end" component of the intermediary Web site **30** and is configured to receive various requests from users

accessing the intermediary Web site 30 and to serve responses to these requests. Moreover, utilizing one or more application programs 44, the Web server 40 is configured to gather information about products offered for sale at each of a plurality of Web sites 32, and store this information within a data structure maintained by the database 42.

Exemplary Web servers that may be utilized as a Web server 40 by the illustrated intermediary Web site 30 include, but are not limited to, Apache, available from the Apache Server Project (www.apache.org); Microsoft's Internet Information Server (IIS), available from Microsoft Corporation, Redmond, Washington; and Netscape's FastTrack® and Enterprise™ servers, available from America Online, Inc., Dulles, Virginia. Other Web servers that may be utilized include Novell's Web Server for users of its NetWare® operating system, available from Novell, Inc., San Jose, California; and IBM's family of Lotus Domino® servers, available from International Business Machines Corporation, Armonk, New York.

As is known by those of skill in the art, a database is a collection of data that is organized in some format (*e.g.*, "tables"). A database typically includes a database manager that facilitates accessing, managing, and updating data within the various tables of a database. Exemplary types of databases that can be utilized to perform the various functions of the illustrated database 42, according to the present invention, include relational databases, distributed databases (databases that are dispersed or replicated among different points in a network), and object-oriented

databases. Relational, distributed, and object-oriented databases are well understood by those of skill in the art and need not be discussed further herein. Exemplary databases that can be utilized to perform the various functions of the illustrated database **42** include, but are not limited to, IBM's DB2® database, Microsoft's SQL server database, and database products from Oracle, Sybase, and Computer Associates.

A database server (not illustrated) may be utilized to serve as a "middleman" server between the Web server **40** and the database **42**. As is known to those of skill in the art, a database server includes program code and logic for retrieving data from databases (and from sources external to a Web site) in response to requests from a Web server. Exemplary database servers that may be utilized as a database server by the illustrated intermediary Web site **30** include, but are not limited to, Microsoft's SQL server, IBM DB2® Universal Database server, and the WebSphere™ Net.Commerce server, the latter two being available from International Business Machines Corporation, Armonk, New York.

The illustrated intermediary Web site **30** is configured to communicate with users accessing the intermediary Web site **30** via a client program, such as a browser, running on a client device **36**. These users may include subscribers that are registered with the intermediary and non-subscribing visitors. Exemplary client devices executing a browser include, but are not limited to, personal computers, wireless communications devices, personal digital assistants (PDAs), hand-held computers, Internet-ready phones, and WebTVs. As illustrated in

Fig. 3, browsers running on various client devices 36 of subscribers and visitors may communicate with the Web server 40 of the intermediary Web site 30 via a communications network 34, such as the Internet. However, it is understood that the present invention may be implemented across a private computer network such as an intranet.

A data structure is stored within the database 42. A data structure according to an embodiment of the present invention includes a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites 32 on a computer network 34. At least one classifier is associated with one or more of the nodes. Each classifier includes a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute. Each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node.

Each node may include language-specific information associated therewith, wherein the language-specific information includes information about a product category or subcategory relative to one or more human languages. Also, each node may include culture-specific information associated with a node, wherein the culture-specific information comprises information about a product category or sub-category relative to one or more human cultures. Data structures according to embodiments of the present invention are described in greater detail below.

According to embodiments of the present invention, the Web server **40** performs various functions. For example, the Web server **40**, utilizing one or more content acquisition application programs **44a**, selects a Web site **32** and selects a node from the stored data structure. A search request that comprises names and value ranges from classifiers associated with the selected node is created, the selected Web site **32** is searched for products offered for sale that satisfy the search request, and information about each product for sale at the selected Web site **32** that satisfies the search request is retrieved and stored in the database **42**.

The Web server **40**, utilizing one or more data retrieval application programs **44b**, is also configured to receive a product search request from a user, to search nodes of the data structure in the database **42** for products that satisfy the received search request, and to send results of the search to the requesting user in a format displayable within a user device display. A user-manipulatable slider widget may also be sent with the search results that is configured to change the search results displayed dynamically in real time in response to user manipulation of the slider widget.

The Web server **40**, utilizing one or more Web site transaction application programs **44c**, is also configured to purchase products selected by users from multiple Web sites **32**. For example, upon receiving a product purchase request from a user to purchase a first product from a first Web site and a second product from a second Web site, the Web server, using one or more purchasing transaction application programs, executes a transaction with

the first and second Web sites on behalf of the user and without requiring the user to communicate with the first and second Web sites. The Web server 40 then sends results of the executed transactions with the first and second Web sites to the user.

An exemplary type of application program that may be used by the Web server 40 in performing various ones of the above-described functions (content acquisition, data retrieval and storage, purchasing transactions) is a Common Gateway Interface (CGI) application program. As is understood by those of skill in the art, CGI is a standard that allows clients to interface with various application programs via Web servers. A Web server processes a client CGI request using a CGI script or application program. For example, when a database is queried by a client, a Web server acts as a gateway between the database and the client. The Web server transmits the client request to a CGI application program that performs the database query, formats the results and returns HTML-formatted data to the Web server. The Web server then transmits the HTML-formatted data to the client for display to the user.

It is understood that the present invention is not limited to the use of CGI application programs. For example, Microsoft Active Server Pages (ASP) technology and Java Server Pages (JSP) technology may be utilized to perform various ones of the above described functions and to retrieve and transmit information from and to client devices 36 and Web sites 32 in accordance with embodiments of the present invention.

It is also understood that the present

invention may be implemented using a standalone workstation, personal computer, and/or mainframe computer.

Data Structure

Embodiments of the present invention dynamically cluster results from user searches for products offered for sale at various Web sites based on a product hierarchy created and maintained by an intermediary. The present invention distributes products in search results to different product families depending on descriptions of the products. Clustering based on product family generates clusters that may be more intuitive than traditional e-commerce approaches wherein products located in search results are clustered on the basis of certain predefined keywords that are common to all kinds of products. Category-specific clustering according to the present invention utilizes a data structure (also referred to as an "ontology") and various data retrieval application programs **44b** that utilize information in the data structure to hierarchically cluster products located in search results.

A data structure according to an embodiment of the present invention includes a plurality of nodes arranged hierarchically. Each node in a data structure according to the present invention represents a category or sub-category of products offered for sale at one or more Web sites on a computer network, such as the Internet.

An exemplary node **50** of a data structure according to embodiments of the present invention is illustrated in **Fig. 4**. The illustrated node **50** includes one or more "classifiers", collectively

indicated as 52 and individually as C_1, C_2 ... C_n. Each classifier 52 includes a name 52a of an attribute of a product category and a range of values 52b associated with the respective product category attribute. An exemplary classifier of a product offered for sale is "price" and is illustrated in Fig. 4 as C_2. The name 52a of the attribute C_2 is "price" and the range 52b of values is the price range of the product offered for sale.

A node 50 may also have one or more "constraints", indicated as 54 in Fig. 4. A constraint 54 is associated with a particular classifier 52 of a node 50 and reduces or modifies the range of values of the classifier 52. The illustrated constraint 54 of Fig. 4 is associated with the classifier C_2 as indicated by link 53. The illustrated constraint 54 reduces the range of values of the classifier C_2 from \$5-\$100 to \$40-\$50 for node 50. It is understood that a node according to the present invention may have any number of constraints associated with respective classifiers of the node.

A node 50 may also have culture-specific information 56 and language-specific information 58 associated therewith, as illustrated. Culture-specific information 56 may include information about a product category (or sub-category) represented by a node relative to one or more human cultures. Language-specific information 58 may include information about a product category (or sub-category) represented by a node relative to one or more human languages.

Culture-specific information associated with a node may allow a category (or sub-category)

of products represented by a node to be displayed to users that access a data structure from one or more domains associated with one or more particular cultures. As is known to those of skill in the art, the term "domain", as used with respect to the Internet, refers to a set of network addresses organized in levels. The top level of a domain identifies geographic or purpose commonality (for example, the nation that the domain covers or a category such as "commercial"). For example, www.earthlink.de identifies a set of network addresses in Germany. As an example of culture-specific information associated with a node in accordance with the present invention, a product category, such as "German Pottery" may be limited to searching by users having a German domain (*i.e.*, a top level domain name of ".de").

As another example of culture-specific information, the term "football" to Americans may mean something different than the term "football" to Europeans. Accordingly, a node associated with American football helmets may be limited to access by domains within the United States, for example.

Language-specific information **58** associated with a node includes natural language information, multi-lingual synonyms, and other language-oriented information. For example, the product category (or sub-category) "Hats" represented by a node may include English synonyms for the word "hat" (*e.g.*, caps, berets, bonnets, visors), as well as synonyms from other languages (*e.g.*, chapeau, cappello, berretto, sombrero, hoed).

In addition to language-oriented synonyms,

context-oriented synonyms may also be associated with a node. For example, the term "router" may refer to a power tool used by carpenters, and may refer to a device used in a computer network to control the routes of packets transmitted through the network. As such, a node for the product category (or sub-category) "routers" may include information indicating which type of device is represented by the particular node.

Natural language information may include rules regarding specific "quirks" of particular languages. For example, word order in some languages may be important. As such, a node may include one or more rules that facilitate maintaining proper word order in user searches and in search results. As another example, some languages associate "gender" (*e.g.*, masculine, feminine) with words. As such, a node may include one or more rules that help maintain proper usage of gender in user searches and in search results.

A node **50** in a data structure according to the present invention may also have one or more relationships **59** with one or more different nodes in a data structure, such that, when information associated with the node **50** is displayed to a user accessing the data structure, information associated with another node having a relationship with the node **50** is also displayed to the user. For example, a node associated with the product category (or sub-category) "pants" and a node associated with the product category (or sub-category) "belts" may have a relationship therebetween such that a user interested in purchasing a pair of pants is also presented with information about belts.

Referring now to **Fig.** 5, a parent node **60** and a child node 62 hierarchically depending from the parent node **60** are illustrated. The parent node **60** represents a category of products offered for sale at one or more Web sites **32** on a computer network **34**, and the child node **62** represents a sub-category of products offered for sale at one or more Web sites **32** on the computer network **34**. In the illustrated embodiment, the category represented by the parent node **60** is "Computer Equipment" and the sub-category represented by the child node **62** is "Computer Printers".

The illustrated parent node **60** has one classifier **52** associated therewith that has a name **52a** "MANUFACTURER" and a range **52b** of values of "HP, IBM". The child node **62** has four classifiers **52** associated therewith, each having names **52a** and ranges **52b** of values as follows: 1) name "DOTS PER INCH"; range 300x300, 600x600, 1200x1200; 2) name "PAGES PER MINUTE"; range 2, 3, 4, ... 40; 3) name "MANUFACTURER"; range "HP, XEROX, EPSON, LEXMARK"; and 4) name "PRINT PROCESS"; range "DOT MATRIX, INKJET, LASER. Each classifier **52** associated with the child node **62** inherits attribute names and value ranges from the classifier **52** associated with the parent node **60**. In the illustrated embodiment, this means that the value of the range of the classifier with the name "MANUFACTURER" would be expanded to include "IBM".

A data structure implemented in accordance with the present invention includes at least one parent node that represents a category of products offered for sale at one or more Web sites on a computer network (*e.g.*, the Internet). At least one

classifier is associated with the parent node, and includes a name of an attribute of the product category and a range of values associated with the product category attribute. At least one child node is hierarchically associated with the parent node. Each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network. At least one classifier is associated with each child node, and includes a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute. Each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node.

Each child node in a data structure according to the present invention may include a constraint that is associated with a parent node classifier and that reduces or modifies the range of values of the parent node classifier. Each node in a data structure according to the present invention may include culture-specific information and language-specific information, as described above. Moreover, each node in a data structure according to the present invention may include a relationship with one or more other nodes in the data structure such that when information associated with one node is displayed to a user accessing the data structure, information associated with another node is also displayed to the user.

Referring now to **Fig. 6**, an exemplary data structure **70** stored on a computer readable storage medium according to an embodiment of the present invention is illustrated. The illustrated data

structure 70 includes a plurality of nodes 50a-50i arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites 32 on a computer network 34. The illustrated data structure 70 is referred to as a directed acyclical graph (DAG). DAGs can be more efficient to populate with information and to search than conventional tree structures. DAGs are well known to those of skill in the art and need not be described herein. The illustrated data structure 70 has at least one parent node 50a, and a plurality of child nodes 50b-50i hierarchically associated with the parent node 50a. It is understood that some of the child nodes (*i.e.*, nodes 50b, 50c, 50h) can also be parent nodes of other child nodes.

The illustrated data structure 70 has a node 50a associated with the product category "APPAREL" and two nodes 50b, 50c associated with subcategories "PANTS" and "SHOES" depending therefrom. The node 50b associated with the product sub-category "PANTS" has three nodes 50d, 50e, 50f depending therefrom and that are associated with the sub-categories "LONG PANTS", "ATHLETIC PANTS", and "SHORT PANTS", respectively. The node 50c associated with the product sub-category "SHOES" has two nodes 50g, 50h depending therefrom and that are associated with the sub-categories "LEATHER SHOES", and "ATHLETIC SHOES", respectively. The node 50h associated with the product sub-category "ATHLETIC SHOES" has one node 50i depending therefrom that is associated with the product sub-category "CLEATS".

The illustrated node 50a associated with the product category "APPAREL" has three classifiers

52 referred to individually as C_1, C_2, and C_3. Classifier C_1 has the name **52a** "MATERIAL" and a range **52b** of values of "LEATHER, DENIM, COTTON, NYLON". Classifier C_2 has the name **52a** "GENDER" and a range **52b** of values of "MEN'S, WOMEN'S". Classifier C_3 has the name "STYLE" and a range of values of "FORMAL, CASUAL".

The node **50e** associated with the product sub-category "ATHLETIC PANTS" has a relationship **59** established with the node **50h** associated with the product sub-category "ATHLETIC SHOES". Accordingly, when information associated with "ATHLETIC PANTS" (node **50e**) is displayed to a user accessing the data structure **70** via intermediary Web site **30**, information associated with "ATHLETIC SHOES" (node **50h**) is also displayed to the user.

The node **50h** associated with the product sub-category "ATHLETIC SHOES" has a classifier **52** having a name **52a** "SPORTS" and a range **52b** of values "BASKETBALL, SOCCER, FOOTBALL". The node **50i** associated with the product sub-category "CLEATS" has a constraint **54** that reduces the range **52b** of values of the classifier **52** associated with the node **50h** to "SOCCER and FOOTBALL". Accordingly, the product subcategory "CLEATS" represented by node **50i** applies only to soccer and football, and not to basketball.

The node **50g** associated with the product sub-category "LEATHER SHOES" has language-specific information **58** associated therewith. Specifically, Spanish and French synonyms for leather shoes (zapatillo, zapato, chaussure de plage) are included.

Data Structure Content Acquisition

The data structure 70 illustrated in Fig. 6 is for illustrative purposes only. An actual data structure implemented in accordance with embodiments of the present invention will typically have hundreds or thousands of nodes that represent hundreds or thousands of product categories and sub-categories. Once a data structure in accordance with the present invention is created, actual product information from various Web sites 32 is retrieved and associated with respective ones of the nodes.

Referring now to Fig. 7, operations utilized by an intermediary for retrieving information about one or more products offered for sale at Web sites 32 on a computer network 34, according to embodiments of the present invention, are illustrated. As described above, these operations may be performed by a Web server 40 in conjunction with one or more content acquisition application programs 44a.

Initially, an intermediary selects a Web site 32 on a computer network 34 from which to extract product information (Block 100). The intermediary then selects a node from a data structure maintained by the intermediary and stored in a computer readable format on a computer readable/usable storage medium (Block 110). A search request that includes names and value ranges from classifiers associated with the selected node is created (Block 120).

The selected Web site 32 is then searched for products offered for sale that satisfy the search request (Block 130). Information about each product for sale at the selected Web site 32 that

satisfies the search request is retrieved (Block 140). The retrieved information preferably includes at least a name and description of each product found at the Web site that satisfies the search request.

Operations represented by Blocks 100-140 are preferably implemented by a Web server 40 in conjunction with one or more content acquisition application programs 44a. A particularly preferred content acquisition application program is a "spider." A spider is configured to visit Web sites and read Web pages and other information. A spider can be configured to selectively visit and index entire Web sites or specific pages at a Web site. Spiders can crawl through a Web site's pages in several ways. One way is to follow all the hypertext links in each page
until all the pages have been read. Spider programs are well understood by those of skill in the art and need not be discussed further herein.

Web sites may include a search engine. As such, the step of searching a Web site may be conducted using the search engine of the Web site.

A method of extracting HTML data from a Web page using Extensible Markup Language (XML) in accordance with an embodiment of the present invention is described below in Example 1.

Retrieved information associated with each product that satisfies a search request is preferably assigned a display priority that determines a priority in which information about a product is displayed to a user accessing the data structure (Block 150). Operations for assigning a display priority to retrieved information may

include assigning a first priority to a product having a name that satisfies the search request, and assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

The retrieved information is stored in a computer readable storage medium with a link to the selected node of the data structure (Block **160**). According to a preferred embodiment, the retrieved information is stored in tables **80a**, **80b**, **80c** of a database **82** as illustrated in **Fig. 8**. The illustrated database **82** includes a Node/Product table **80a**, a Product table **80b**, and a Node/Classifier/Product table **80c**.

The illustrated Node/Product table **80a** includes a "Node" field, a "Product ID" field, and a "Match Index" field. The "Node" field identifies a product category or sub-category associated with a particular node of a data structure according to embodiments of the present invention. The "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site.

The "Match Index" field contains a value that identifies a display priority of a particular product offered for sale. A "Match Index" value may be obtained by assigning numerical values based on where a user's product search term is found at a particular Web site. For example, if a user is interested in Nike® shoes, a particular value is assigned to a pair of Nike® shoes offered for sale at a Web site. A lower value may be assigned if a Web site only contains information describing Nike®

shoes, and does not actually offer them for sale. In addition, a "Match Index" value may be assigned based on other factors, such as popularity of the product. In the illustrated Node/Product table **80a**, the higher the "Match Index" value, the higher the display priority of a particular product in response to a user search request.

The illustrated Product table **80b** includes a "Product ID" field and a "Product Information" field. As described above, the "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site. The "Product Information" field provides descriptive information about a respective product.

The illustrated Node/Classifier/Product table **80c** includes a "Node Index" field, a "Classifier Name" field, a "Classifier Value" field, a "Product ID" field, and a "Match Index" field. The "Node Index" field identifies a specific node within a data structure according to the present invention. The "Classifier Name" field identifies a classifier associated with a node. The "Classifier Range of Values" field identifies the range of values of a classifier, as described above. As described above, the "Product ID" field identifies a unique product within the category or sub-category that is currently offered for sale at a Web site. As described above, the "Match Index" field contains a value that identifies a display priority of a particular product offered for sale.

It is understood that data structures according to the present invention may have various tables. The present invention is not limited to the illustrated tables.

Referring back to **Fig. 7**, a determination is then made whether the selected node of the data structure has a child node depending therefrom (Block **170**). If the answer is "No", operations are terminated. If the answer is "Yes", a child node is selected (Block **180**) and operations represented by Blocks **120-160** are repeated for the selected child node. This process continues until all child nodes of the originally-selected node have been selected and product information has been retrieved and stored within the data structure.

Operations represented by Blocks **100-180** are repeated for multiple Web sites. In addition, operations represented by Blocks **100-180** are repeated periodically to identify changes in products offered for sale by each Web site, including changes in information (*e.g.*, price) associated with each product.

Data Retrieval from Data Structure

Referring now to **Fig. 9**, operations for retrieving information about products offered for sale at one or more Web sites on a computer network according to embodiments of the present invention are illustrated. Initially, an intermediary receives a product search request from a user via an intermediary Web site (Block **200**). A user can provide multi-lingual information within a search request. For example, a French user interested in purchasing "hats", can enter the term "chapeau" and the intermediary Web site will return information from Web sites that sell hats, regardless of the language used by the Web site.

A Web server 40 at the intermediary Web site 30 searches for nodes of a data structure (described above) maintained by the intermediary that satisfy the received search request (Block 210). The intermediary sends the results of the search (*i.e.*, information about products associated with each node) to the user in a prioritized format that is displayable within a user device display (Block 220). For search results that do not match any nodes in the data structure, products that satisfy the search request are retrieved directly based on one or more heuristic search methods.

The Web server 40 (or application program utilized or accessed by the Web server 40 to perform a search of a data structure) uses the structure and content of the data structure to respond to the search request. For example, if the search request is for "rouge chapeau," the Web server 40 looks for all occurrences of the words "rouge" and "chapeau" in the data structure. Scores are assigned to nodes in the data structure based on heuristics. "Rouge" may appear in the range of the classifier "color" associated with a node called (in French) "chapeau." The classifier "color" may also be inherited from a (grand)parent node of the "chapeau" node (*e.g.*, root->apparel->hats). When "chapeau" is itself a node in the data structure, it is assigned a certain score. Whereas another node in the data structure may contain a book concerning hats whose location in the data structure is denoted by (root=>books=>appearel=>"rouge chapeau"). This would receive another score based on its position in the data structure.

Heuristic scores are computed according to

the accuracy of a match of search results with a search request and according to how deep within the data structure a match was found. For example, the node "red hat" would receive a higher score than the node "red hat book" for the search request "red hat." The node identified by the path root=>Apparel=>red hat will receive a higher score than the node denoted by root=>book=>software=>linux=>red hat for the search request "red hat." Classifiers may also affect a score. For example, a node which has classifiers which partially match a search request, but which are not in the node name may receive a higher score than nodes that partially match the search request but do not have a classifier match.

An intermediary Web site according to the present invention is configured to receive user requests to purchase products displayed within search results (Block 230). In response to receiving a user request to purchase a product in the search results, the Web server 40 at the intermediary Web site 30 is configured to execute a purchase transaction on behalf of the user at one or more of the Web sites (Block 240), and to send the results of the executed transaction to the user (Block 250).

According to another embodiment of the present invention, sending the results of a search to a user may include sending a user-manipulatable slider widget to the user with the search results. A slider widget according to the present invention is configured to change the search results displayed within a user device display dynamically in real time in response to user manipulation. Preferably, a slider widget is configured to dynamically change

search results based on the range of values of classifiers associated with nodes of the data structure. For example, a slider widget may be configured to allow a user to change displayed results based upon sales price (a node classifier) of products in a list.

Unlike existing search technologies that typically require a user to drill down from broad to specific categories, the present invention may allow consumers to set specific parameters through a series of dynamic slider widgets to define and clarify their search and to avoid browsing through unnecessary search results. Slider widgets allow users to dynamically filter and adjust search results, thereby instantly refining and redirecting searches, even in multiple languages.

The present invention may facilitate a more natural e-commerce experience because it can avoid the hierarchical access methods of searching prevalent at most e-commerce Web sites. Consumers can control their own shopping experience by utilizing intelligent keyword searching and on-the-fly customization. For example, while searching for toys, a consumer can specify a price and age range in real time so that the resulting product descriptions fit both the consumer's budget and a child's developmental level. A consumer can modify search characteristics "mid-stream" (*e.g.*, changing the price range from $25-$50 to $51-$75) rather than starting over with a new search, as would be the case with conventional search engines.

Referring now to **Fig. 10**, a user interface **85** is displayed that contains search results from a user request made in accordance with the present

invention and that also contains a plurality of slider widgets **86a-86e**. The search results displayed relate to computer printers available for sale at one or more Web sites. For each printer available for sale, the following information is provided within the user interface **85**: an image **87a**, printer name **87b**, Web site **87c** where printer is being offered for sale, printer category **87d**, printer price **87e**, whether the printer is "in stock" **87f**, printer color **87g**, printer dpi (dots per inch) **87h**, printer ppm (pages per minute) **87i**, and printer memory **87j**.

The illustrated slider widgets **86a-86e** allow a user to change the displayed search results based on selected printer information. For example, a user may manipulate slider widget **86a** to change the displayed search results based on printer category. The user may manipulate slider widget **86b** to change the displayed search results based on whether a printer is in stock. The user may manipulate slider widget **86c** to change the displayed search results based on printer memory. The user may manipulate slider widget **86d** to change the displayed search results based on printer price. The user may manipulate slider widget **86e** to change the displayed search results based on printer dpi. Each slider widget **86a-86e** provides a range of values that a user can change. For example, the slider widget related to printer dpi may allow a user to display printers for sale that have a range of dpi values (*e.g.*, a range of 300 dpi to 1200 dpi).

A user may manipulate the illustrated slider widgets **86a-86e** either alone or in various combinations. For example, a user may wish to see

printers having a price less than $1,500 that also have a dpi of greater than 600.

Multi-Site Product Purchasing

The present invention may further enhance the e-commerce experience by allowing items from multiple merchants to be purchased in any language via a unified checkout procedure. Accordingly, the time and drudgery that is often involved in filling out order forms and logging on and off of multiple sites may be reduced.

A Web server 40 of an intermediary Web site according to the present invention is preferably configured to execute a transaction with individual Web sites on behalf of a user and without requiring a user to communicate with the individual Web sites. For example, when first and second Web sites each have respective on-line shopping cart applications executing thereon, a Web server according to the present invention provides information about the first product and the user to the first Web site shopping cart application, and provides information about the second product and the user to the second Web site shopping cart application. Each transaction can be completed without requiring any involvement by the user. As would be understood by those of skill in the art, purchasing transactions conducted in accordance with the present invention may be performed using various secure methods, including, but not limited to SSL (Secure Sockets Layer) technology.

Example 1

XML is currently a formal recommendation from the

World Wide Web Consortium as a way to make the Web a more versatile tool. XML syntax guidelines and the definition of XML entities are presented in the Extensible Markup Language (XML) 1.0 Specification, February 10, 1998, which is incorporated herein by reference in its entirety and which is available from the World Wide Web Consortium (www.w3.org) and specifically at (www.w3.org/TR/1998/REC-xml-19980210).

XML is similar to HTML in that both languages are subsets of Standard Generalized Markup Language (SGML) and that both utilize tags to describe the contents of a page or file. HTML, however, describes the content of a Web page (mainly text and graphic images) only in terms of how content is to be displayed and interacted with. XML describes the content in terms of what data is being described. For example, a <PHONENUM> tag could indicate that the data following the tag is a phone number. This means that an XML file can be processed purely as data by a program or it can be stored with similar data on another computer or, like an HTML file, that it can be displayed. For example, depending on how the application program in the receiving computer wanted to handle the phone number, it could be stored, displayed, or dialed. XML is "extensible" because, unlike HTML, XML markup tags can be unlimited and can be self-defining.

The structure of an XML document is essentially a tree. The root element is the top-level element, and its descendants (*i.e.*, the other elements) branch out from there. XML parsers are applications that examine XML code and report forming errors. An XML parser reads XML files,

generates a hierarchically structured tree, herein referred to as a Document Object Model Tree ("DOM Tree"), and then hands off data to viewers and other applications for processing.

Document Type Definitions (DTDs) may accompany an XML document, essentially defining the rules of the XML document, such as which elements are present and the structural relationship between the elements. DTDs can help validate data when a receiving application does not have a built-in description of the incoming XML data.

The following XML-DTD describes the syntax for extracting data from a Web site according to an embodiment of the present invention.

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT ProdPage (Pid, Field+)>
<!ELEMENT Field (TextField | Url | Form | Properties)>
<!ATTLIST Field
      name CDATA #REQUIRED
>
<!ELEMENT TextField (TextPattern+)>
<!ELEMENT Url (UrlPattern+)>
<!ELEMENT Form EMPTY>
<!ATTLIST Form
      formNo CDATA #REQUIRED
>
<!ELEMENT Properties (PropertiesPattern+)>
<!ELEMENT Pattern (TextPattern | UrlPattern |
PropertiesPattern)>
<!ELEMENT TextPattern (Prefix, TextGetter, StringOp?,
Suffix?, Boundary?)>
<!ELEMENT UrlPattern (Prefix, Suffix?, Boundary?)>
<!ELEMENT PropertiesPattern (Prefix, TextGetter,
StringOp?, Suffix?, Boundary?, Delimiters)>
<!ELEMENT Prefix (#PCDATA | Seek)*>
<!ELEMENT Seek (SingleSeek)+>
<!ELEMENT SingleSeek (TokenNumber | (TokenRegex |
```

```
Regex)|*>
<!ELEMENT TokenNumber EMPTY>
<!ATTLIST TokenNumber
      tagname CDATA #REQUIRED
      index NMTOKEN #REQUIRED
>
<!ELEMENT TokenRegex (AttrToken)*>
<!ELEMENT AttrToken (Regex)>
<!ATTLIST AttrToken
      attrname CDATA #REQUIRED
>
<!ELEMENT Regex (#PCDATA)>
<!ELEMENT StringOp (SubString | Append)>
<!ELEMENT TextGetter (GetNextPcData | GetTextUntil)>
<!ELEMENT GetNextPcData EMPTY>
<!ELEMENT GetTextUntil (Boundary)>
<!ELEMENT Suffix (Seek)>
<!ELEMENT Boundary (Seek)>
<!ELEMENT Pid (StringOp)>
<!ELEMENT Delimiters EMPTY>
<!ATTLIST Delimiters
      delims CDATA #REQUIRED
>
<!ELEMENT SubString (#PCDATA)>
<!ELEMENT Append (#PCDATA)>
<!ELEMENT TagName (#PCDATA)>
<!ATTLIST TokenRegex
      TagName CDATA #REQUIRED
>
```

The following shows how the above XML file is used to describe the structure of a product page at the Web site www.barnesandnoble.com. The extension "ext" is used for such files and are called extractor files.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ProdPage SYSTEM
```

```
"d:\muggy\o3cprototype\documents\Extractor.dtd">
<ProdPage>
   <Pid>
      <StringOp>
         <SubString/>
      </StringOp>
   </Pid>
   <Field name="Name">
      <TextField>
         <TextPattern>
            <Prefix>
               <Seek>
                  <SingleSeek>
                     <TokenRegex TagName="IMG">
                        <AttrToken attrname="SRC">

<Regex>gresources/gutter_default.gif</Regex>
                        </AttrToken>
                     </TokenRegex>
                     <TokenRegex TagName="/TD"/>
                     <TokenRegex TagName="TD"/>
                     <TokenRegex TagName="FONT"/>
                  </SingleSeek>
               </Seek>
            </Prefix>
            <TextGetter>
               <GetTextUntil>
                  <Boundary>
                     <Seek>
                        <SingleSeek>
                           <TokenRegex TagName="BR"/>
                        </SingleSeek>
                     </Seek>
                  </Boundary>
               </GetTextUntil>
            </TextGetter>
         </TextPattern>
      </TextField>
   </Field>
   <Field name="imgUrl">
      <Url>
```

```
                <UrlPattern>
                    <Prefix>
                        <Seek>
                            <SingleSeek>
                                <TokenRegex TagName="IMG">
                                    <AttrToken attrname="SRC">
                                        <Regex>Bookcover</Regex>
                                    </AttrToken>
                                </TokenRegex>
                            </SingleSeek>
                        </Seek>
                    </Prefix>
                    <Boundary>
                        <Seek>
                            <SingleSeek>
                                <TokenRegex TagName ="TABLE"/>
                            </SingleSeek>
                        </Seek>
                    </Boundary>
                </UrlPattern>
            </Url>
        </Field>
        <Field name="Properties">
            <Properties>
                <PropertiesPattern>
                    <Prefix>imgUrl</Prefix>
                    <TextGetter>
                        <GetTextUntil>
                            <Boundary>
                                <Seek>
                                    <SingleSeek>
                                        <TokenRegex TagName="IMG"/>
                                        <TokenRegex TagName="BR"/>
                                    </SingleSeek>
                                </Seek>
                            </Boundary>
                        </GetTextUntil>
                    </TextGetter>
                    <StringOp>
                        <SubString/>
                    </StringOp>
```

```
                    <Delimiters delims=":"/>
                </PropertiesPattern>
            </Properties>
        </Field>
        <Field name="Desc">
            <TextField>
                <TextPattern>
                    <Prefix>
                        <Seek>
                            <SingleSeek>
                                <Regex>From the Publisher</Regex>
                            </SingleSeek>
                        </Seek>
                    </Prefix>
                    <TextGetter>
                        <GetNextPcData/>
                    </TextGetter>
                </TextPattern>
            </TextField>

            <TextField>
                <TextPattern>
                    <Prefix>
                        <Seek>
                            <SingleSeek>
                                <Regex>From the Library
Journal</Regex>
                            </SingleSeek>
                        </Seek>
                    </Prefix>
                    <TextGetter>
                        <GetNextPcData/>
                    </TextGetter>
                </TextPattern>
            </TextField>
        </Field>
    </ProdPage>
```

Any XML tool with the capability of validating XML documents against a DTD can be used

to generate the extractor files. A configuration file according to an embodiment of the present invention stores configuration information such as URL of a Web page and the locations of all the "extractor" files. An exemplary configuration file is illustrated below.

```
<site name="Barnesandnoble" home=www.bn.com
navigation-type=1>
        <search-page file="bnSearchPage.ext"/>
        <product-list file="bnProductList.ext"/>
        <product-page file="bnCompProductPage.ext"/>
        <error-log file="bnCompError.log">
    </site>
```

The <Seek> tag allows a user to specify a regular expression to extract information from a web page. The following example extracts the "Name" of a product from a Web page:

```
<Field name="Name">
   <TextField>
      <TextPattern>
         <Prefix>
            <Seek>
               <SingleSeek>
                  <TokenRegex TagName="IMG">
                     <AttrToken attrname="SRC">

<Regex>gresources/gutter_default.gif</Regex>
                     </AttrToken>
                  </TokenRegex>
                  <TokenRegex TagName="/TD"/>
                  <TokenRegex TagName="TD"/>
                  <TokenRegex TagName="FONT"/>
               </SingleSeek>
            </Seek>
         </Prefix>
         <TextGetter>
            <GetTextUntil>
```

```
                    <Boundary>
                      <Seek>
                        <SingleSeek>
                          <TokenRegex TagName="BR"/>
                        </SingleSeek>
                      </Seek>
                    </Boundary>
                  </GetTextUntil>
                </TextGetter>
              </TextPattern>
            </TextField>
          </Field>
```

The "Field" denoted "Name" is being extracted, wherein "Name" is a text field. "TextField" is sought using a construct called TextPattern". An argument to the "TextPattern" is a "Prefix". To locate the "Prefix" a "Seek" is used. A series of constructs called "Regex" are used to search for the particular prefix. At this point, the "Name" of the product has been located. "TextGetter" is then used which retrieves all the text in the Web page until the HTML tag <br>, which located using the "Seek" construct as explained above.

Example 2

Referring now to **Figs. 11-12**, exemplary user interfaces that illustrate various embodiments of the present invention are provided. Referring initially to **Fig. 11**, an exemplary user interface **1000** served by an intermediary Web site, according to an embodiment of the present invention is illustrated. The user interface **1000** is displayed within a browser window **1002** and includes links **1004** to various retailer Web sites. In addition, the

illustrated user interface **1000** includes a search field **1006** within which a user can enter search terms regarding various products of interest to the user. In the illustrated user interface **1000**, a user has entered the search term "gloves".

Upon activation of search button **1008**, a search of a data structure as described above is initiated for the term "gloves" and search results are returned to the user in the user interface **1010** illustrated in **Fig. 12**. The search results displayed within the user interface **1010** of **Fig. 12** include a name **1010a**, description **1010b**, and price **1010c** of each product satisfying the search criteria.

Example 3

Referring now to **Fig. 13**, an exemplary user interface **1020** is illustrated that displays products for sale by various Web sites that were selected by a user in accordance with the present invention. The selected products include a GPS satellite navigator **1024**, a pocket organizer **1026**, and a portable DVD player **1028**. Each of the selected products is for sale by a different Web site. For example, the GPS satellite navigator **1024** is offered for sale by the Web site www.fogdog.com; the pocket organizer **1026** is offered for sale by the Web site www.warehouse.com; and the portable DVD player **1028** is offered for sale by the Web site www.800.com.

Preferably, a user is pre-registered with an intermediary prior to conducting searches for products for sale in accordance with the present invention. Accordingly, at "check-out" time, the intermediary can simply request verification of various information such as shipping and billing

information. In the illustrated user interface **1020**, the user is presented with a payment field **1030** and a shipping field **1032** for each displayed product. In addition, a shipping address field **1034** is provided. Upon selecting and/or verifying that the displayed shipping and billing information is correct, a user can activate the "Submit" button **1036** to have the intermediary execute respective transactions at each of the three Web sites (www.fogdog.com; www.warehouse.com; and www.800.com) on behalf of the user and without requiring the user to communicate with the Web sites.

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the appended claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

THAT WHICH IS CLAIMED IS:

1. A data structure stored on a computer readable storage medium, the data structure comprising:

a parent node, wherein the parent node represents a category of products offered for sale at one or more Web sites on a computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the respective product category attribute;

a child node hierarchically associated with the parent node, wherein the child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with the child node, wherein each classifier comprises a name of an attribute of the product sub-category and a range of values associated with the product sub-category attribute;

wherein each classifier associated with the child node inherits attribute names and value ranges from classifiers associated with the parent node.

2. The data structure according to Claim 1, further comprising a constraint associated with a parent node classifier, wherein the constraint reduces the range of values of the parent node classifier.

3. The data structure according to Claim 1, further comprising a constraint associated with a child node classifier, wherein the constraint reduces the range of values of the child node classifier.

4. The data structure according to Claim 1 further comprising culture-specific information associated with the parent node, wherein the culture-specific information comprises information about the product category relative to one or more human cultures.

5. The data structure according to Claim 1 further comprising culture-specific information associated with a child node, wherein the culture-specific information comprises information about the product sub-category relative to one or more human cultures.

6. The data structure according to Claim 1 further comprising language-specific information associated with the parent node, wherein the language-specific information comprises information about the product category relative to one or more human languages.

7. The data structure according to Claim 1 further comprising language-specific information associated with a child node, wherein the language-specific information comprises information about the product sub-category relative to one or more human languages.

8. The data structure according to Claim 1 further comprising a relationship between the parent node and the child node such that when information associated with the parent node is displayed to a user accessing the data structure, information associated with the child node is also displayed to the user.

9. The data structure according to Claim 1 further comprising a relationship between a first child node and a second child node such that when information associated with the first child node is displayed to a user accessing the data structure, information associated with the second child node is also displayed to the user.

10. A data structure stored on a computer readable storage medium, the data structure comprising:

a plurality of nodes arranged in hierarchical order, wherein each node represents a respective category or sub-category of products offered for sale at one or more Web sites on a computer network;

at least one classifier associated with one or more of the nodes, wherein each classifier comprises a name of an attribute of a product category or sub-category and a range of values associated with a respective attribute, wherein each classifier associated with a node that is a child node of a parent node inherits attribute names and value ranges from one or more classifiers associated with the parent node; and

language-specific information associated with at least one node, wherein the language-specific information comprises information about a product category or subcategory relative to one or more human languages.

11. The data structure according to Claim 10 further comprising at least one constraint associated with a node classifier, wherein the constraint reduces the range of values of the node classifier.

12. The data structure according to Claim 10 further comprising culture-specific information associated with a node, wherein the culture-specific information comprises information about a product category or sub-category relative to one or more human cultures.

13. The data structure according to Claim 10 further comprising a relationship between a first node and a second node such that when information associated with the first node is displayed to a user accessing the data structure, information associated with the second node is also displayed to the user.

14. A method of retrieving information about one or more products offered for sale at a Web site on a computer network, the method comprising the following steps performed by an intermediary:

selecting a Web site on the computer network;

selecting a node from a data structure

stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

creating a search request that comprises names and value ranges from classifiers associated with the selected node;

searching the selected Web site for products offered for sale that satisfy the search

request; and

retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and description of each product.

15. The method according to Claim 14 wherein the selected Web site comprises a search engine and wherein the step of searching is conducted using the search engine of the Web site.

16. The method according to Claim 14, further comprising the step of storing the retrieved information in a computer readable storage medium with a link to the selected node.

17. The method according to Claim 14 further comprising the step of assigning a display priority to the retrieved information associated with each product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure.

18. The method according to Claim 17 wherein the step of assigning a display priority to the retrieved information comprises:

assigning a first priority to a product having a name that satisfies the search request; and

assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

19. The method according to Claim 18 wherein the selected node is a parent node and further comprising the following steps performed by the intermediary:

selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

creating a search request that comprises names and value ranges from classifiers associated with the selected child node;

searching the selected Web site for products offered for sale that satisfy the search request; and

retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

20. A method of retrieving information about one or more products offered for sale at a Web site on a computer network, the method comprising the following steps performed by an intermediary:

selecting a Web site on the computer network;

selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated

with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

creating a search request that comprises names and value ranges from classifiers associated with the selected node;

searching the selected Web site for products offered for sale that satisfy the search request;

retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and description of each product;

assigning a display priority to the

retrieved information associated with each product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure; and

storing the retrieved information in a computer readable storage medium with an assigned display priority and a link to the selected node.

21. The method according to Claim 20 wherein the selected Web site comprises a search engine and wherein the step of searching is conducted using the search engine of the Web site.

22. The method according to Claim 20 wherein the step of assigning a display priority to the retrieved information comprises:

assigning a first priority to a product having a name that satisfies the search request; and

assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

23. The method according to Claim 20 wherein the selected node is a parent node and further comprising the following steps performed by the intermediary:

selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

creating a search request that comprises names and value ranges from classifiers associated

with the selected child node;

searching the selected Web site for products offered for sale that satisfy the search request; and

retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

24. A method of locating products offered for sale at one or more Web sites on a computer network, the method comprising the following steps performed by an intermediary:

receiving a product search request from a user;

searching for nodes of a data structure that satisfy the received search request, wherein the data structure is stored on a computer readable storage medium and comprises:

at least one parent node that represents a category of products offered for sale at one or more of the Web sites on the computer network;

at least one classifier associated with each parent node, wherein each classifier comprises a name of an attribute of a product category and a range of values associated with the respective product category attribute;

at least one child node hierarchically related to a parent node, wherein each child node represents a sub-category of products offered for sale at

one or more of the Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node;

sending results of the search to the user, wherein the search results comprise a list of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

25. The method according to Claim 24 wherein the step of sending search results to the user comprises sending the search results in a format displayable within a user device display.

26. The method according to Claim 25 further comprising sending a user-manipulatable slider widget to the user with the search results, wherein the slider widget is configured to change the search results displayed within a user device display in real time in response to user manipulation of the slider widget.

27. The method according to Claim 26 wherein
the slider widget is configured to allow a user to change displayed results based upon sales price of

products in the list.

28. The method according to Claim 26 wherein the slider widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products in the list.

29. The method according to Claim 24 further comprising the step of receiving a user request to purchase at least one product within the list.

30. The method according to Claim 29 further comprising the step of executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the user request to purchase at least one product within the list.

31. A method of purchasing products from multiple Web sites on a computer network, the method comprising the following steps performed by an intermediary:

receiving a product purchase request from a user that comprises a request to purchase a first product from a first Web site and a second product from a second Web site;

executing a transaction with the first Web site to purchase the first product on behalf of the user and without requiring the user to communicate with the first Web site;

executing a transaction with the second Web site to purchase the second product on behalf of the user and without requiring the user to

communicate with the second Web site; and

sending results of the executed transactions with the first and second Web sites to the user.

32. The method according to Claim 31 wherein the first and second Web sites each have respective on-line shopping cart applications executing thereon, wherein the step of executing a transaction with the first Web site to purchase the first product comprises providing information about the first product and the user to the first Web site shopping cart application, and wherein the step of executing a transaction with the second Web site to purchase the second product comprises providing information about the second product and the user to the second Web site shopping cart application.

33. The method according to Claim 31 wherein the step of sending results of the executed transactions with the first and second Web sites to the user comprises sending the results in a format displayable within a user device display.

34. A data processing system for retrieving information about one or more products offered for sale at a Web site on a computer network, comprising:

means for selecting a Web site on the computer network;

means for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that

represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

means for creating a search request that comprises names and value ranges from classifiers associated with the selected node;

means for searching the selected Web site for products offered for sale that satisfy the search request; and

means for retrieving information about each product for sale at the selected Web site that

satisfies the search request, wherein the retrieved information comprises at least a name and description of each product.

35. The data processing system according to Claim 34 wherein the selected Web site comprises a search engine and wherein the means for searching utilizes the search engine of the Web site.

36. The data processing system according to Claim 34, further comprising means for storing the retrieved information in a computer readable storage medium with a link to the selected node.

37. The data processing system according to Claim 34 further comprising means for assigning a display priority to the retrieved information associated with each product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure.

38. The data processing system according to Claim 37 wherein the means for assigning a display priority to the retrieved information comprises:

means for assigning a first priority to a product having a name that satisfies the search request; and

means for assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

39. The data processing system according to Claim 38 wherein the selected node is a parent node and further comprising:

means for selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

means for creating a search request that comprises names and value ranges from classifiers associated with the selected child node;

means for searching the selected Web site for products offered for sale that satisfy the search request; and

means for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

40. A data processing system for retrieving information about one or more products offered for sale at a Web site on a computer network, comprising:

means for selecting a Web site on the computer network;

means for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each

classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

means for creating a search request that comprises names and value ranges from classifiers associated with the selected node;

means for searching the selected Web site for products offered for sale that satisfy the search request;

means for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and description of each product;

means for assigning a display priority to the retrieved information associated with each

product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure; and

means for storing the retrieved information in a computer readable storage medium with an assigned display priority and a link to the selected node.

41. The data processing system according to Claim 40 wherein the selected Web site comprises a search engine and wherein the means for searching utilizes the search engine of the Web site.

42. The data processing system according to Claim 40 wherein the means for assigning a display priority to the retrieved information comprises:

means for assigning a first priority to a product having a name that satisfies the search request; and

means for assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

43. The data processing system according to Claim 40 wherein the selected node is a parent node and further comprising:

means for selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

means for creating a search request that

comprises names and value ranges from classifiers associated with the selected child node;

means for searching the selected Web site for products offered for sale that satisfy the search request; and

means for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

44. A data processing system for locating products offered for sale at one or more Web sites on a computer network, comprising:

means for receiving a product search request from a user;

means for searching for nodes of a data structure that satisfy the received search request, wherein the data structure is stored on a computer readable storage medium and comprises:

at least one parent node that represents a category of products offered for sale at one or more of the Web sites on the computer network;

at least one classifier associated with each parent node, wherein each classifier comprises a name of an attribute of a product category and a range of values associated with the respective product category attribute;

at least one child node hierarchically related to a parent node, wherein each child node represents a sub-category of products offered for sale at

one or more of the Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node;

means for sending results of the search to the user, wherein the search results comprise a list of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

45. The data processing system according to Claim 44 wherein the means for sending search results to the user comprises means for sending the search results in a format displayable within a user device display.

46. The data processing system according to Claim 45 further comprising means for sending a user-manipulatable slider widget to the user with the search results, wherein the slider widget is configured to change the search results displayed within a user device display in real time in response to user manipulation of the slider widget.

47. The data processing system according to Claim 46 wherein the slider widget is configured

to allow a user to change displayed results based upon sales price of products in the list.

48. The data processing system according to Claim 46 wherein the slider widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products in the list.

49. The data processing system according to Claim 44 further comprising means for receiving a user request to purchase at least one product within the list.

50. The data processing system according to Claim 49 further comprising means for executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the user request to purchase at least one product within the list.

51. A data processing system for purchasing products from multiple Web sites on a computer network, comprising:

means for receiving a product purchase request from a user that comprises a request to purchase a first product from a first Web site and a second product from a second Web site;

means for executing a transaction with the first Web site to purchase the first product on behalf of the user and without requiring the user to communicate with the first Web site;

means for executing a transaction with the second Web site to purchase the second product on

behalf of the user and without requiring the user to communicate with the second Web site; and

means for sending results of the executed transactions with the first and second Web sites to the user.

52. The data processing system according to Claim 51 wherein the first and second Web sites each have respective on-line shopping cart applications executing thereon, wherein the means for executing a transaction with the first Web site to purchase the first product comprises means for providing information about the first product and the user to the first Web site shopping cart application, and wherein the means for executing a transaction with the second Web site to purchase the second product comprises means for providing information about the second product and the user to the second Web site shopping cart application.

53. The data processing system according to Claim 51 wherein the means for sending results of the executed transactions with the first and second Web sites to the user comprises means for sending the results in a format displayable within a user device display.

54. A computer program product for retrieving information about one or more products offered for sale at a Web site on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for selecting a Web site on the computer network;

computer readable program code for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

computer readable program code for

creating a search request that comprises names and value ranges from classifiers associated with the selected node;

computer readable program code for searching the selected Web site for products offered for sale that satisfy the search request; and

computer readable program code for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and description of each product.

55. The computer program product according to Claim 54 wherein the selected Web site comprises a search engine and wherein the computer readable program code for searching utilizes the search engine of the Web site.

56. The computer program product according to Claim 54, further comprising computer readable program code for storing the retrieved information in a computer readable storage medium with a link to the selected node.

57. The computer program product according to Claim 54 further comprising computer readable program code for assigning a display priority to the retrieved information associated with each product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure.

58. The computer program product

according to Claim 57 wherein the computer readable program code for assigning a display priority to the retrieved information comprises:

computer readable program code for assigning a first priority to a product having a name that satisfies the search request; and

computer readable program code for assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

59. The computer program product according to Claim 58 wherein the selected node is a parent node and further comprising:

computer readable program code for selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

computer readable program code for creating a search request that comprises names and value ranges from classifiers associated with the selected child node;

computer readable program code for searching the selected Web site for products offered for sale that satisfy the search request; and

computer readable program code for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

60. A computer program product for

retrieving information about one or more products offered for sale at a Web site on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for selecting a Web site on the computer network;

computer readable program code for selecting a node from a data structure stored on a computer readable storage medium, wherein the data structure comprises:

at least one parent node that represents a category of products offered for sale at one or more Web sites on the computer network;

at least one classifier associated with the parent node, wherein each classifier comprises a name of an attribute of the product category and a range of values associated with the product category attribute;

at least one child node hierarchically associated with the parent node, wherein each child node represents a sub-category of products offered for sale at one or more Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a

respective product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node of the respective child node;

computer readable program code for creating a search request that comprises names and value ranges from classifiers associated with the selected node;

computer readable program code for searching the selected Web site for products offered for sale that satisfy the search request;

computer readable program code for retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and description of each product;

computer readable program code for assigning a display priority to the retrieved information associated with each product that satisfies the search request, wherein a display priority determines a priority in which information about a product is displayed to a user accessing the data structure; and

computer readable program code for storing the retrieved information in a computer readable storage medium with an assigned display priority and a link to the selected node.

61. The computer program product according to Claim 60 wherein the selected Web site

comprises a search engine and wherein the computer readable program code for searching utilizes the search engine of the Web site.

62. The computer program product according to Claim 60 wherein the computer readable program code for assigning a display priority to the retrieved information comprises:

computer readable program code for assigning a first priority to a product having a name that satisfies the search request; and

computer readable program code for assigning a second priority that is different than the first priority to a product having a description that contains one or more words that satisfy the search request.

63. The computer program product according to Claim 60 wherein the selected node is a parent node and further comprising:

computer readable program code for selecting a child node from the data structure stored on the computer readable storage medium, wherein the child node is hierarchically related to the parent node;

computer readable program code for creating a search request that comprises names and value ranges from classifiers associated with the selected child node;

computer readable program code for searching the selected Web site for products offered for sale that satisfy the search request; and

computer readable program code for

retrieving information about each product for sale at the selected Web site that satisfies the search request, wherein the retrieved information comprises at least a name and a description of each product.

64. A computer program product for locating products offered for sale at one or more Web sites on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for receiving a product search request from a user;

computer readable program code for searching for nodes of a data structure that satisfy the received search request, wherein the data structure is stored on a computer readable storage medium and comprises:

at least one parent node that represents a category of products offered for sale at one or more of the Web sites on the computer network;

at least one classifier associated with each parent node, wherein each classifier comprises a name of an attribute of a product category and a range of values associated with the respective product category attribute;

at least one child node hierarchically related to a parent node, wherein each child node represents a sub-

category of products offered for sale at one or more of the Web sites on the computer network; and

at least one classifier associated with each child node, wherein each classifier comprises a name of an attribute of a product sub-category and a range of values associated with a product sub-category attribute;

wherein each classifier associated with a child node inherits attribute names and value ranges from classifiers associated with a parent node;

computer readable program code for sending results of the search to the user, wherein the search results comprise a list of one or more products offered for sale at one or more of the Web sites that satisfy the received user request.

65. The computer program product according to Claim 64 wherein the computer readable program code for sending search results to the user comprises computer readable program code for sending the search results in a format displayable within a user device display.

66. The computer program product according to Claim 65 further comprising computer readable program code for sending a user-manipulatable slider widget to the user with the search results, wherein the slider widget is configured to change the search results displayed within a user device display in real time in response to user manipulation of the slider widget.

67. The computer program product according to Claim 66 wherein the slider widget is configured to allow a user to change displayed results based upon sales price of products in the list.

68. The computer program product according to Claim 66 wherein the slider widget is configured to allow a user to change displayed results based upon a range of values of an attribute of products in the list.

69. The computer program product according to Claim 64 further comprising computer readable program code for receiving a user request to purchase at least one product within the list.

70. The computer program product according to Claim 69 further comprising computer readable program code for executing a purchase transaction on behalf of the user at one or more of the Web sites in response to receiving the user request to purchase at least one product within the list.

71. A computer program product for purchasing products from multiple Web sites on a computer network, the computer program product comprising a computer usable storage medium having computer readable program code embodied in the medium, the computer readable program code comprising:

computer readable program code for receiving a product purchase request from

a user that comprises a request to purchase a first product from a first Web site and a second product from a second Web site;

computer readable program code for executing a transaction with the first Web site to purchase the first product on behalf of the user and without requiring the user to communicate with the first Web site;

computer readable program code for executing a transaction with the second Web site to purchase the second product on behalf of the user and without requiring the user to communicate with the second Web site; and

computer readable program code for sending results of the executed transactions with the first and second Web sites to the user.

72. The computer program product according to Claim 71 wherein the first and second Web sites each have respective on-line shopping cart applications executing thereon, wherein the computer readable program code for executing a transaction with the first Web site to purchase the first product comprises computer readable program code for

providing information about the first product and the user to the first Web site shopping cart application, and wherein the computer readable program code for executing a transaction with the second Web site to purchase the second product comprises computer readable program code for providing information about the second product and the user to the second Web site shopping cart application.

73. The computer program product according to Claim 71 wherein the computer readable program code for sending results of the executed transactions with the first and second Web sites to the user comprises computer readable program code for sending the results in a format displayable within a user device display.

Netscape
File Edit View Go Window Help
Back Forward Reload Home Search Guide Print Security Stop
Register Sign In
GAP
MEN'S
WOMEN'S
GIFTS
CHECKOUT
HELP
12
10
▷ 2000 PANTS click here to win
GapMaternity
exclusively online
what's new for women:
• style scene: our top picks
• summer shorts
• must-have capris
• pants@gap.com:
more sizes, fits, and colors
what's new for men:
• wear to work
• pants@gap.com:
more sizes, fits, and colors
everything you need:
gapkids.com
babygap.com
bananarepublic.com
men's
summer
shorts
> from pleated and flat front to cargo and carpenter, we've got your pairs here
> click here for women's shorts
Hassle-free returns: Doesn't fit? Wrong color? Return it either to any Gap store or by mail.
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SITE DIRECTORY
COMPANY INFO
REGISTER
gap.com is all about ease:
• Getting Started. First time user? Click here.
• Email us or call 1-800-GAP-STYLE (1-800-427-7895) any day, anytime.
• Your information is always Gap Secure.
Sign up for email...and a chance to win in our 2000 Pants Contest.
Privacy Policy/Terms of Use
We currently deliver orders within the United States and U.S. territories only.

FIG. 1A.

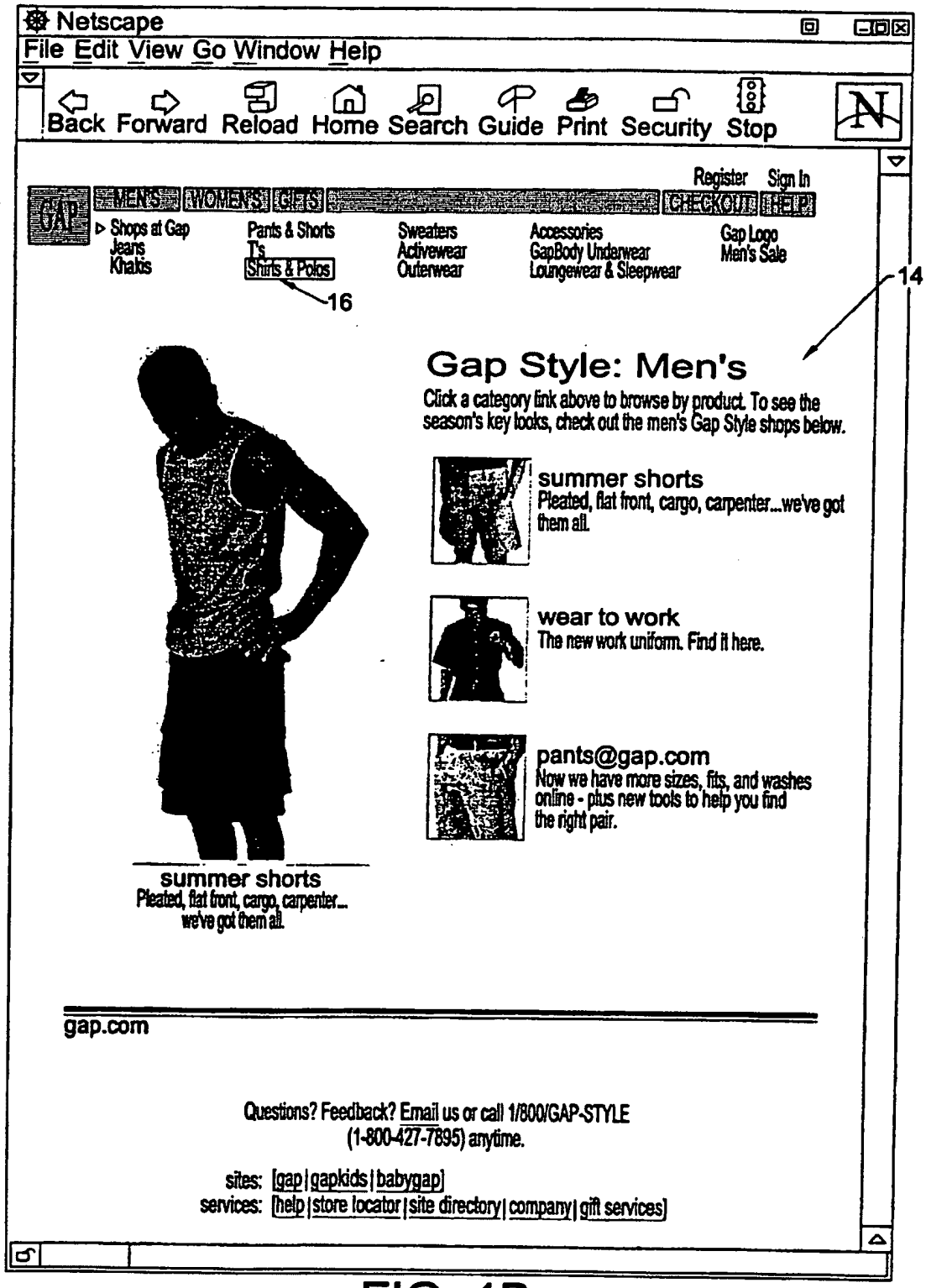

Netscape
File Edit View Go Window Help
Back Forward Reload Home Search Guide Print Security Stop
Register Sign In
GAP
MEN'S WOMEN'S GIFTS CHECKOUT HELP
Shops at Gap
Jeans
Khakis
Pants & Shorts
T's
Shirts & Polos
Sweaters
Activewear
Outerwear
Accessories
GapBody Underwear
Loungewear & Sleepwear
Gap Logo
Men's Sale
16
14
Gap Style: Men's
Click a category link above to browse by product. To see the season's key looks, check out the men's Gap Style shops below.
summer shorts
Pleated, flat front, cargo, carpenter...we've got them all.
wear to work
The new work uniform. Find it here.
pants@gap.com
Now we have more sizes, fits, and washes online - plus new tools to help you find the right pair.
summer shorts
Pleated, flat front, cargo, carpenter... we've got them all.
gap.com
Questions? Feedback? Email us or call 1/800/GAP-STYLE (1-800-427-7895) anytime.
sites: [gap | gapkids | babygap]
services: [help | store locator | site directory | company | gift services]

FIG. 1B.

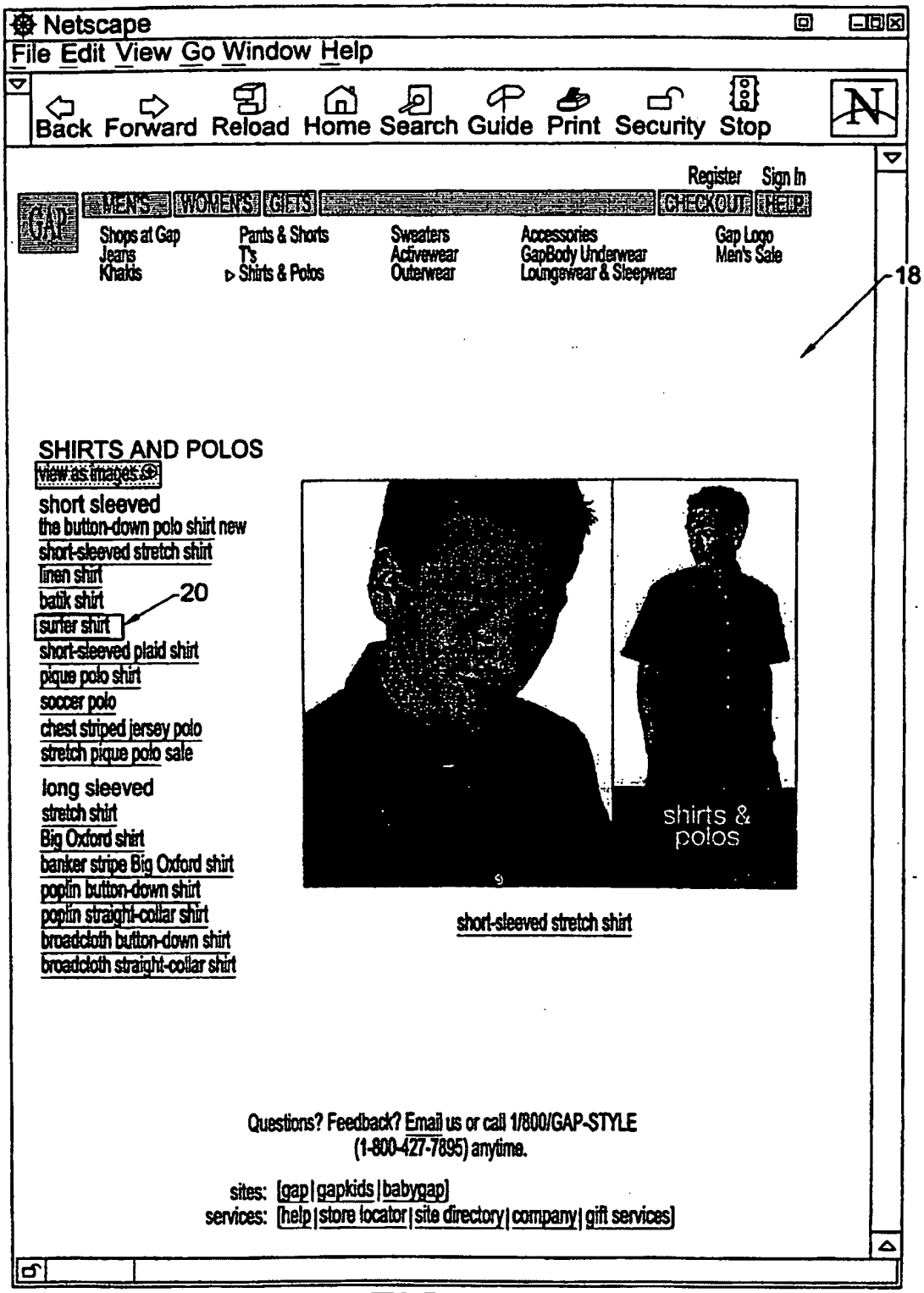
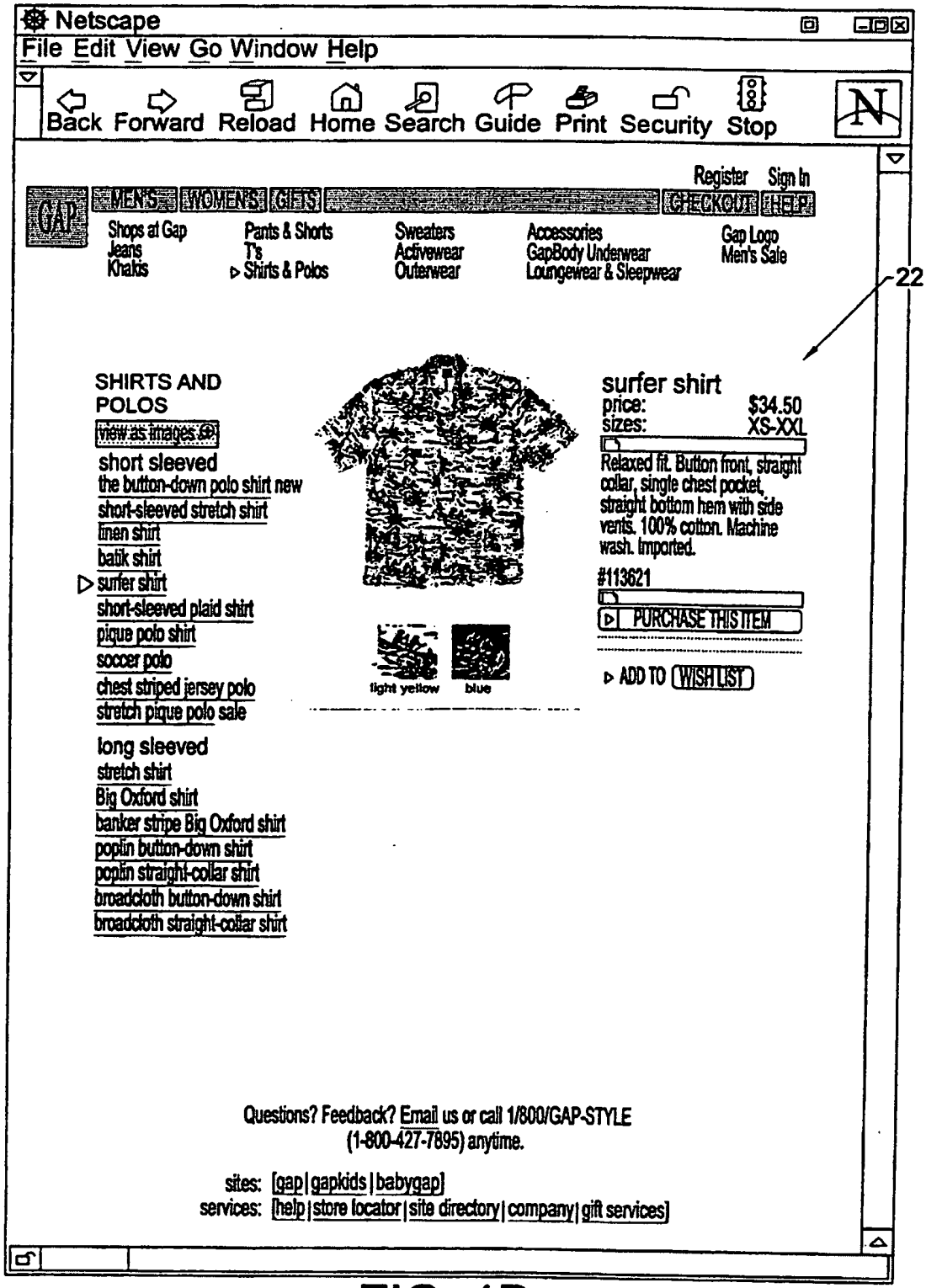

Netscape
File Edit View Go Window Help
Back Forward Reload Home Search Guide Print Security Stop
Register Sign In
GAP
MEN'S WOMEN'S GIFTS CHECKOUT HELP
Shops at Gap
Jeans
Khakis
Pants & Shorts
T's
▷ Shirts & Polos
Sweaters
Activewear
Outerwear
Accessories
GapBody Underwear
Loungewear & Sleepwear
Gap Logo
Men's Sale
18
SHIRTS AND POLOS
view as images
short sleeved
the button-down polo shirt new
short-sleeved stretch shirt
linen shirt
batik shirt
20
surfer shirt
short-sleeved plaid shirt
pique polo shirt
soccer polo
chest striped jersey polo
stretch pique polo sale
long sleeved
stretch shirt
Big Oxford shirt
banker stripe Big Oxford shirt
poplin button-down shirt
poplin straight-collar shirt
broadcloth button-down shirt
broadcloth straight-collar shirt
shirts & polos
short-sleeved stretch shirt
Questions? Feedback? Email us or call 1/800/GAP-STYLE
(1-800-427-7895) anytime.
sites: [gap | gapkids | babygap]
services: [help | store locator | site directory | company | gift services]

FIG. 1C.


Netscape
File Edit View Go Window Help
Back Forward Reload Home Search Guide Print Security Stop
Register Sign In
GAP
MEN'S WOMEN'S GIFTS CHECKOUT HELP
Shops at Gap
Jeans
Khakis
Pants & Shorts
T's
▷ Shirts & Polos
Sweaters
Activewear
Outerwear
Accessories
GapBody Underwear
Loungewear & Sleepwear
Gap Logo
Men's Sale
22
SHIRTS AND POLOS
view as images
short sleeved
the button-down polo shirt new
short-sleeved stretch shirt
linen shirt
batik shirt
▷ surfer shirt
short-sleeved plaid shirt
pique polo shirt
soccer polo
chest striped jersey polo
stretch pique polo sale
long sleeved
stretch shirt
Big Oxford shirt
banker stripe Big Oxford shirt
poplin button-down shirt
poplin straight-collar shirt
broadcloth button-down shirt
broadcloth straight-collar shirt
light yellow
blue
surfer shirt
price: $34.50
sizes: XS-XXL
Relaxed fit. Button front, straight collar, single chest pocket, straight bottom hem with side vents. 100% cotton. Machine wash. Imported.
#113621
▷ PURCHASE THIS ITEM
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Questions? Feedback? Email us or call 1/800/GAP-STYLE
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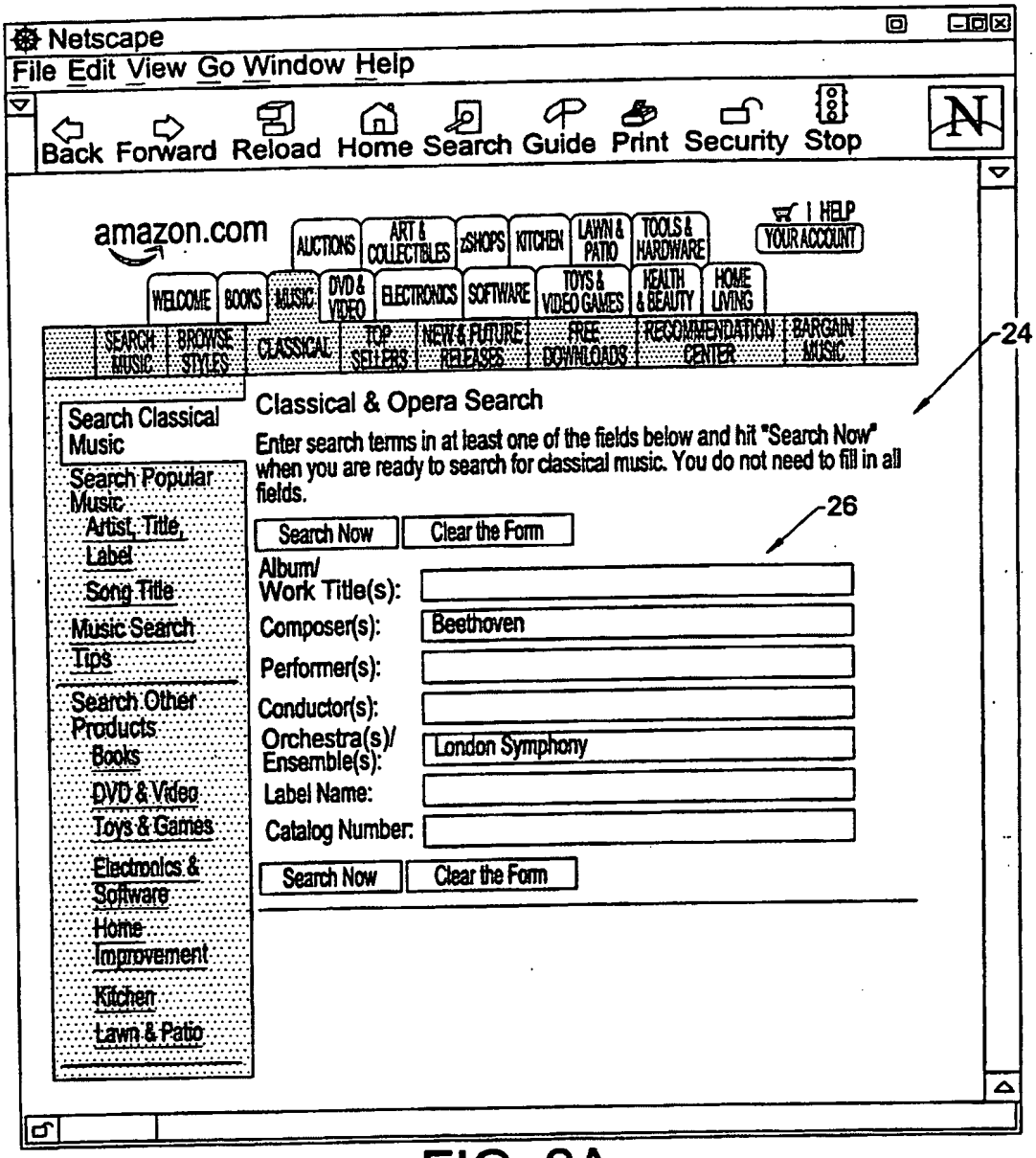
services: [help | store locator | site directory | company | gift services]

FIG. 1D.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amazon.com
AUCTIONS
ART & COLLECTIBLES
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Kitchen
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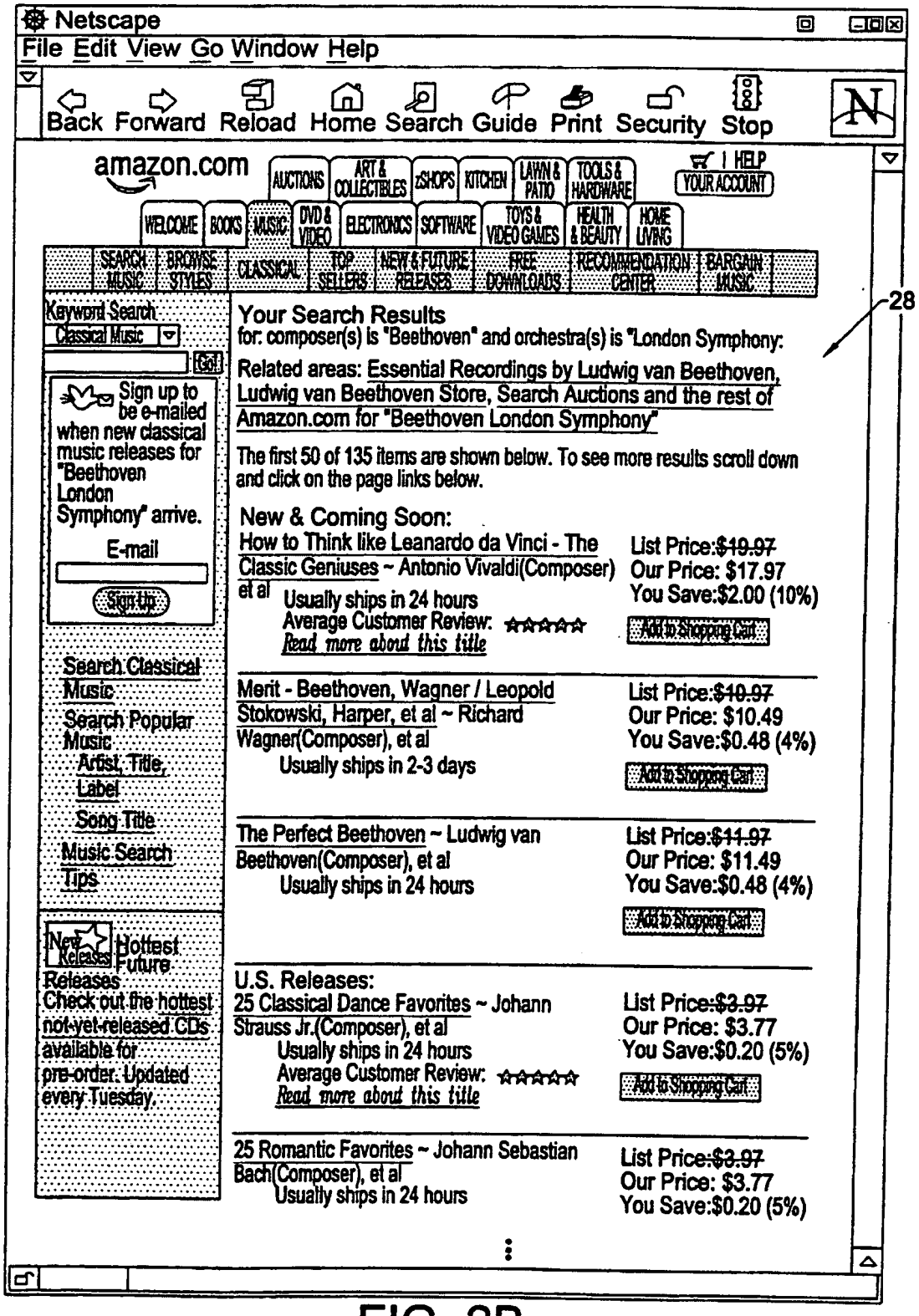
Classical & Opera Search
Enter search terms in at least one of the fields below and hit "Search Now" when you are ready to search for classical music. You do not need to fill in all fields.
26
Search Now
Clear the Form
Album/ Work Title(s):
Composer(s):
Beethoven
Performer(s):
Conductor(s):
Orchestra(s)/ Ensemble(s):
London Symphony
Label Name:
Catalog Number:
Search Now
Clear the Form

FIG. 2A.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SEARCH MUSIC
BROWSE STYLES
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NEW & FUTURE RELEASES
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BARGAIN MUSIC
28
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Sign Up
Search Classical Music
Search Popular Music
Artist, Title, Label
Song Title
Music Search Tips
New Releases
Hottest Future Releases
Check out the hottest not-yet-released CDs available for pre-order. Updated every Tuesday.
Your Search Results
for: composer(s) is "Beethoven" and orchestra(s) is "London Symphony:
Related areas: Essential Recordings by Ludwig van Beethoven, Ludwig van Beethoven Store, Search Auctions and the rest of Amazon.com for "Beethoven London Symphony"
The first 50 of 135 items are shown below. To see more results scroll down and click on the page links below.
New & Coming Soon:
How to Think like Leanardo da Vinci - The Classic Geniuses ~ Antonio Vivaldi(Composer) et al
Usually ships in 24 hours
Average Customer Review:
Read more about this title
List Price:$19.97
Our Price: $17.97
You Save:$2.00 (10%)
Add to Shopping Cart
Merit - Beethoven, Wagner / Leopold Stokowski, Harper, et al ~ Richard Wagner(Composer), et al
Usually ships in 2-3 days
List Price:$10.97
Our Price: $10.49
You Save:$0.48 (4%)
Add to Shopping Cart
The Perfect Beethoven ~ Ludwig van Beethoven(Composer), et al
Usually ships in 24 hours
List Price:$11.97
Our Price: $11.49
You Save:$0.48 (4%)
Add to Shopping Cart
U.S. Releases:
25 Classical Dance Favorites ~ Johann Strauss Jr.(Composer), et al
Usually ships in 24 hours
Average Customer Review:
Read more about this title
List Price:$3.97
Our Price: $3.77
You Save:$0.20 (5%)
Add to Shopping Cart
25 Romantic Favorites ~ Johann Sebastian Bach(Composer), et al
Usually ships in 24 hours
List Price:$3.97
Our Price: $3.77
You Save:$0.20 (5%)

FIG. 2B.

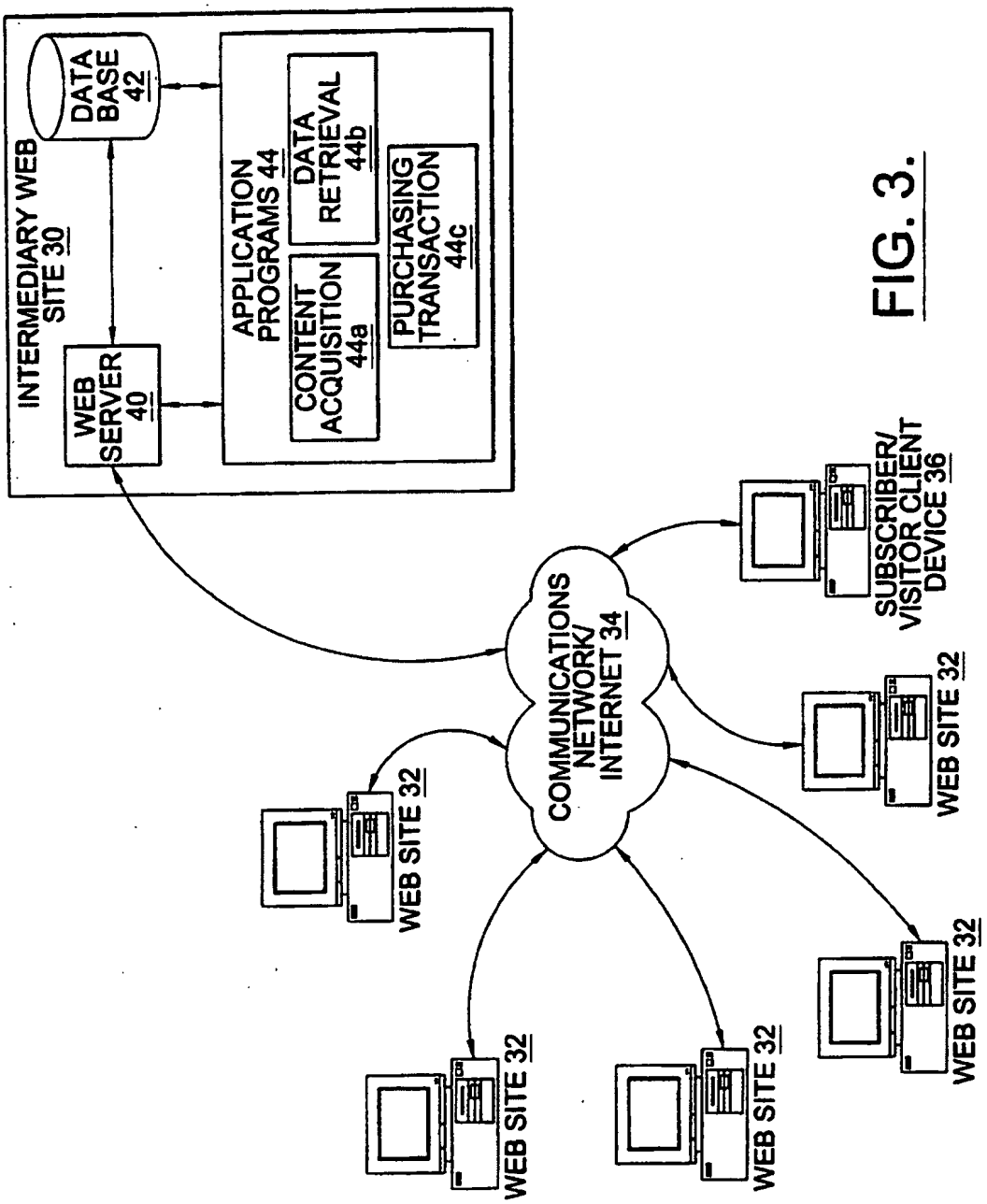

INTERMEDIARY WEB SITE 30
DATA BASE 42
WEB SERVER 40
APPLICATION PROGRAMS 44
CONTENT ACQUISITION 44a
DATA RETRIEVAL 44b
PURCHASING TRANSACTION 44c
COMMUNICATIONS NETWORK/ INTERNET 34
SUBSCRIBER/ VISITOR CLIENT DEVICE 36
WEB SITE 32
WEB SITE 32
WEB SITE 32
WEB SITE 32
WEB SITE 32

FIG. 3.

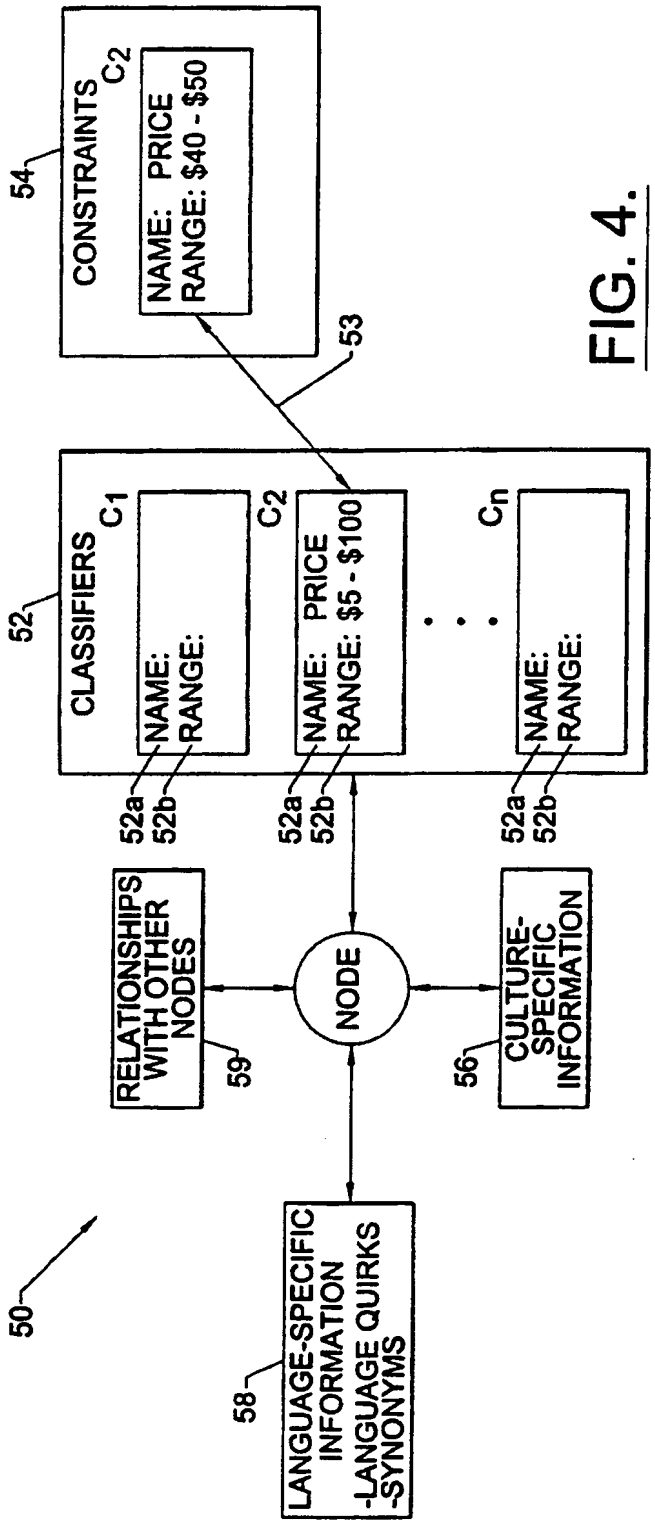

50
CONSTRAINTS
C2
NAME: PRICE
RANGE: $40 - $50
54
53
CLASSIFIERS
C1
NAME:
RANGE:
C2
NAME: PRICE
RANGE: $5 - $100
Cn
NAME:
RANGE:
52
52a
52b
RELATIONSHIPS WITH OTHER NODES
59
NODE
CULTURE-SPECIFIC INFORMATION
56
LANGUAGE-SPECIFIC INFORMATION
-LANGUAGE QUIRKS
-SYNONYMS
58

FIG. 4.

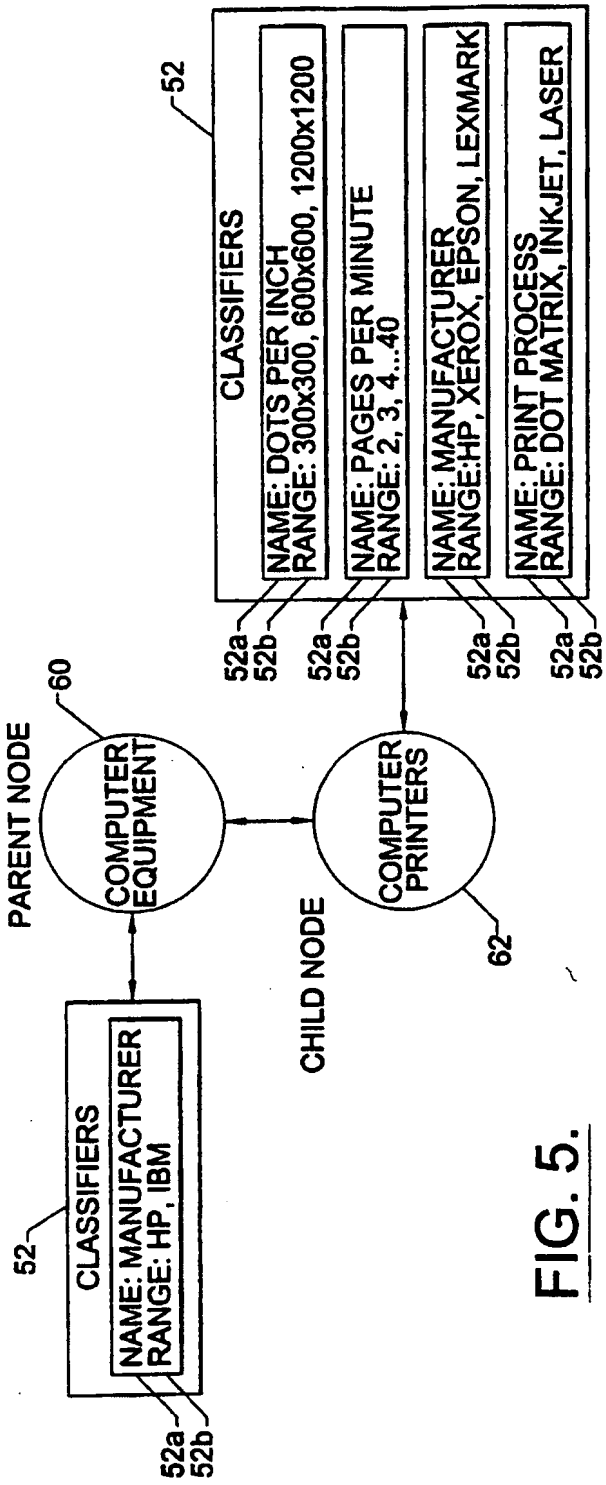

52
CLASSIFIERS
NAME: DOTS PER INCH
RANGE: 300x300, 600x600, 1200x1200
NAME: PAGES PER MINUTE
RANGE: 2, 3, 4...40
NAME: MANUFACTURER
RANGE:HP, XEROX, EPSON, LEXMARK
NAME: PRINT PROCESS
RANGE: DOT MATRIX, INKJET, LASER
52a
52b
52a
52b
52a
52b
52a
52b
60
PARENT NODE
COMPUTER EQUIPMENT
COMPUTER PRINTERS
CHILD NODE
62
52
CLASSIFIERS
NAME: MANUFACTURER
RANGE: HP, IBM
52a
52b

FIG. 5.

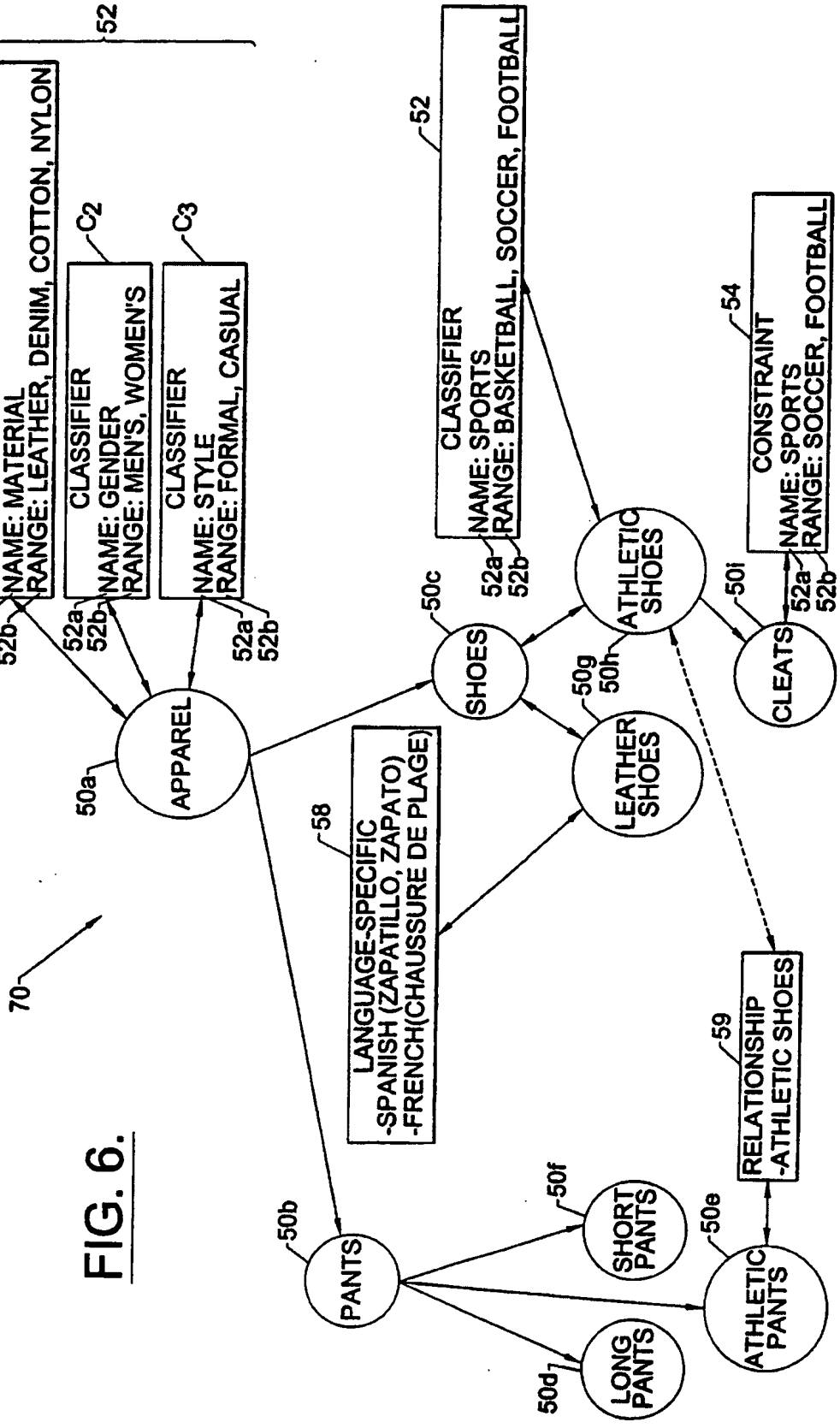

70
APPAREL
50a
PANTS
50b
SHOES
50c
LEATHER SHOES
50g
50h
ATHLETIC SHOES
CLEATS
50i
SHORT PANTS
50f
LONG PANTS
50d
ATHLETIC PANTS
50e
52
C1
CLASSIFIER
NAME: MATERIAL
RANGE: LEATHER, DENIM, COTTON, NYLON
C2
CLASSIFIER
NAME: GENDER
RANGE: MEN'S, WOMEN'S
C3
CLASSIFIER
NAME: STYLE
RANGE: FORMAL, CASUAL
52a
52b
CLASSIFIER
NAME: SPORTS
RANGE: BASKETBALL, SOCCER, FOOTBALL
54
CONSTRAINT
NAME: SPORTS
RANGE: SOCCER, FOOTBALL
58
LANGUAGE-SPECIFIC
-SPANISH (ZAPATILLO, ZAPATO)
-FRENCH(CHAUSSURE DE PLAGE)
59
RELATIONSHIP
-ATHLETIC SHOES

FIG. 6.

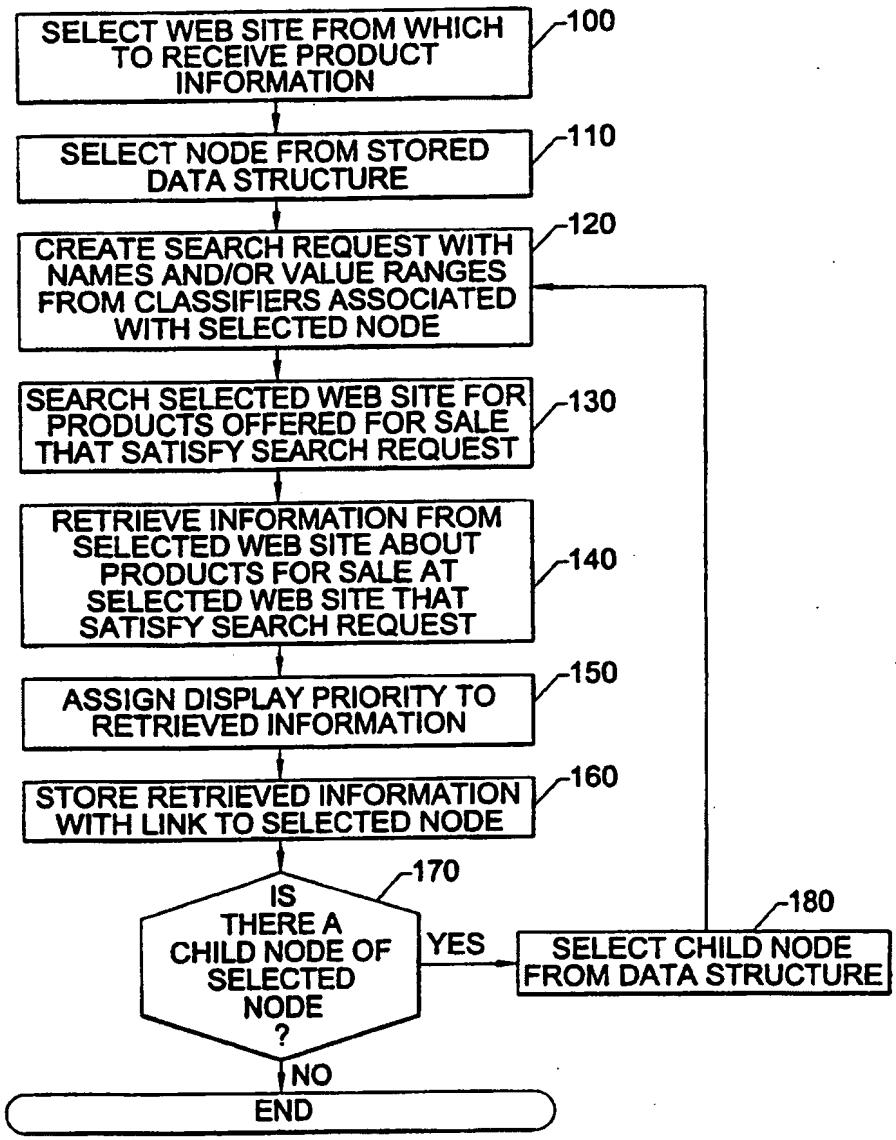

SELECT WEB SITE FROM WHICH TO RECEIVE PRODUCT INFORMATION
100
SELECT NODE FROM STORED DATA STRUCTURE
110
CREATE SEARCH REQUEST WITH NAMES AND/OR VALUE RANGES FROM CLASSIFIERS ASSOCIATED WITH SELECTED NODE
120
SEARCH SELECTED WEB SITE FOR PRODUCTS OFFERED FOR SALE THAT SATISFY SEARCH REQUEST
130
RETRIEVE INFORMATION FROM SELECTED WEB SITE ABOUT PRODUCTS FOR SALE AT SELECTED WEB SITE THAT SATISFY SEARCH REQUEST
140
ASSIGN DISPLAY PRIORITY TO RETRIEVED INFORMATION
150
STORE RETRIEVED INFORMATION WITH LINK TO SELECTED NODE
160
IS THERE A CHILD NODE OF SELECTED NODE ?
170
YES
SELECT CHILD NODE FROM DATA STRUCTURE
180
NO
END

FIG. 7.

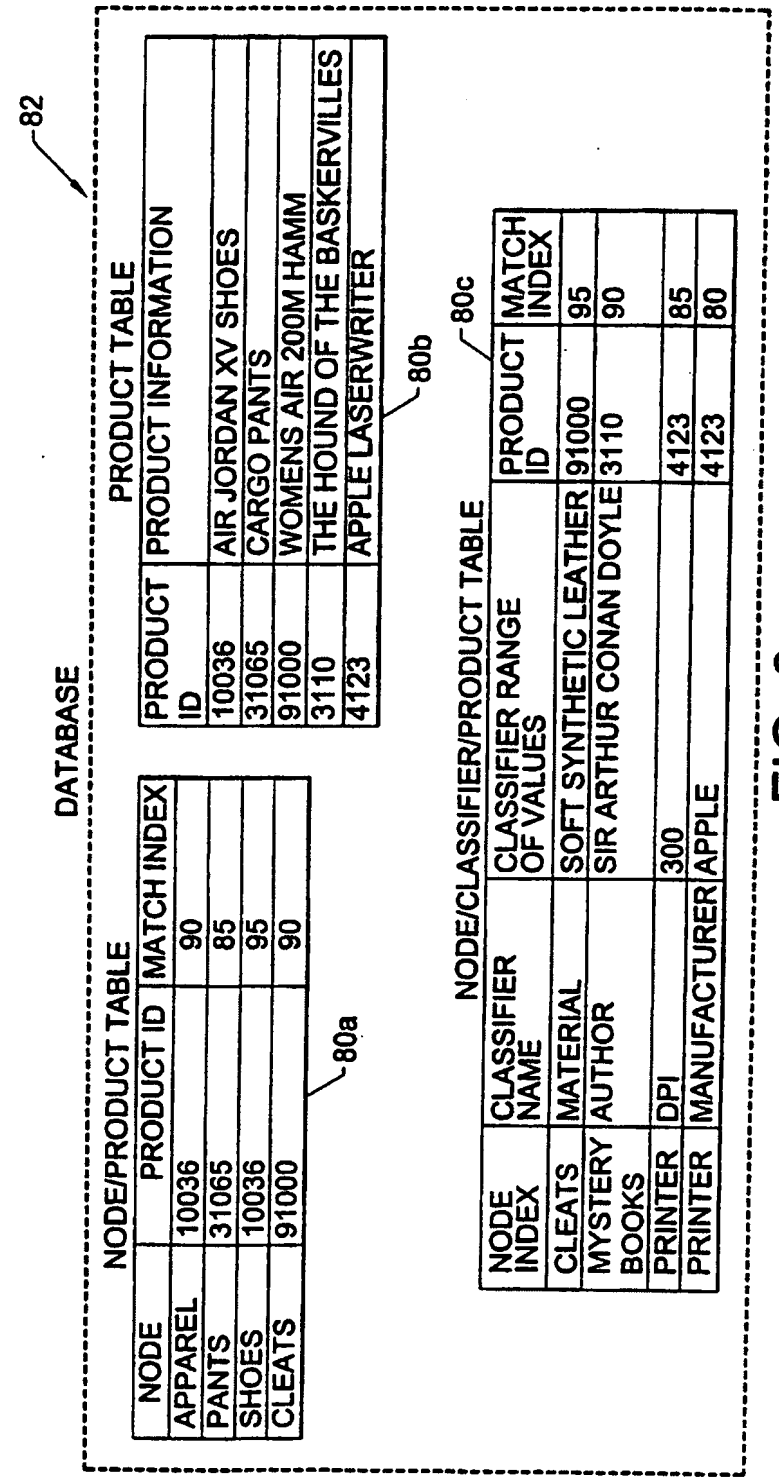

82
DATABASE
NODE/PRODUCT TABLE
NODE
PRODUCT ID
MATCH INDEX
APPAREL
10036
90
PANTS
31065
85
SHOES
10036
95
CLEATS
91000
90
80a
PRODUCT TABLE
PRODUCT ID
PRODUCT INFORMATION
10036
AIR JORDAN XV SHOES
31065
CARGO PANTS
91000
WOMENS AIR 200M HAMM
3110
THE HOUND OF THE BASKERVILLES
4123
APPLE LASERWRITER
80b
NODE/CLASSIFIER/PRODUCT TABLE
80c
NODE INDEX
CLASSIFIER NAME
CLASSIFIER RANGE OF VALUES
PRODUCT ID
MATCH INDEX
CLEATS
MATERIAL
SOFT SYNTHETIC LEATHER
91000
95
MYSTERY BOOKS
AUTHOR
SIR ARTHUR CONAN DOYLE
3110
90
PRINTER
DPI
300
4123
85
PRINTER
MANUFACTURER
APPLE
4123
80

FIG. 8.

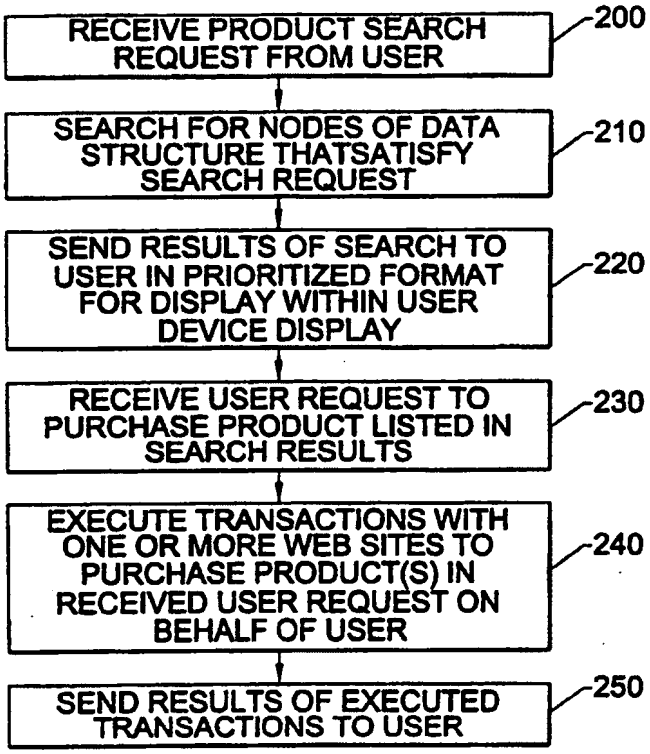

RECEIVE PRODUCT SEARCH REQUEST FROM USER
200
SEARCH FOR NODES OF DATA STRUCTURE THATSATISFY SEARCH REQUEST
210
SEND RESULTS OF SEARCH TO USER IN PRIORITIZED FORMAT FOR DISPLAY WITHIN USER DEVICE DISPLAY
220
RECEIVE USER REQUEST TO PURCHASE PRODUCT LISTED IN SEARCH RESULTS
230
EXECUTE TRANSACTIONS WITH ONE OR MORE WEB SITES TO PURCHASE PRODUCT(S) IN RECEIVED USER REQUEST ON BEHALF OF USER
240
SEND RESULTS OF EXECUTED TRANSACTIONS TO USER
250

FIG. 9.

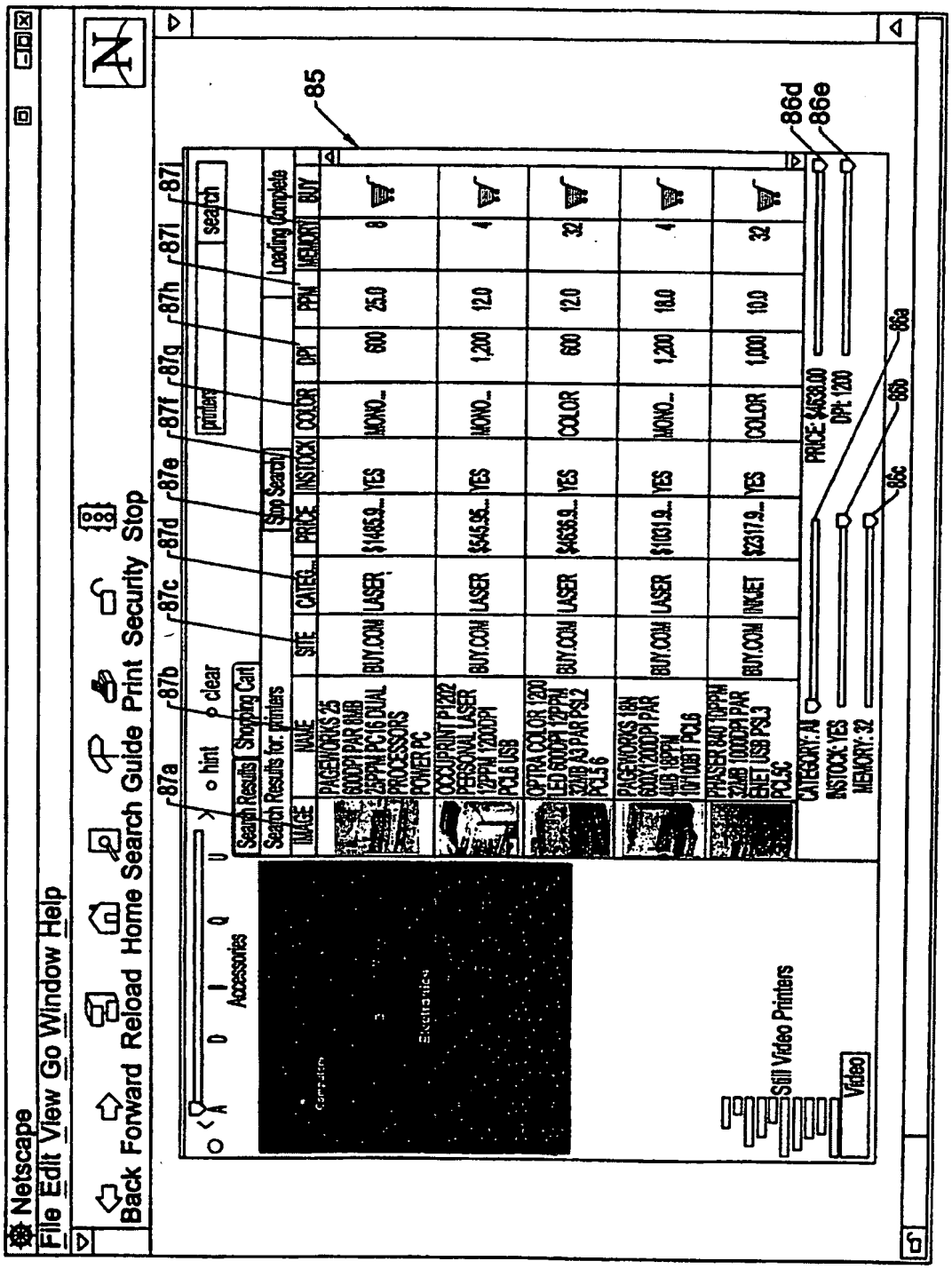
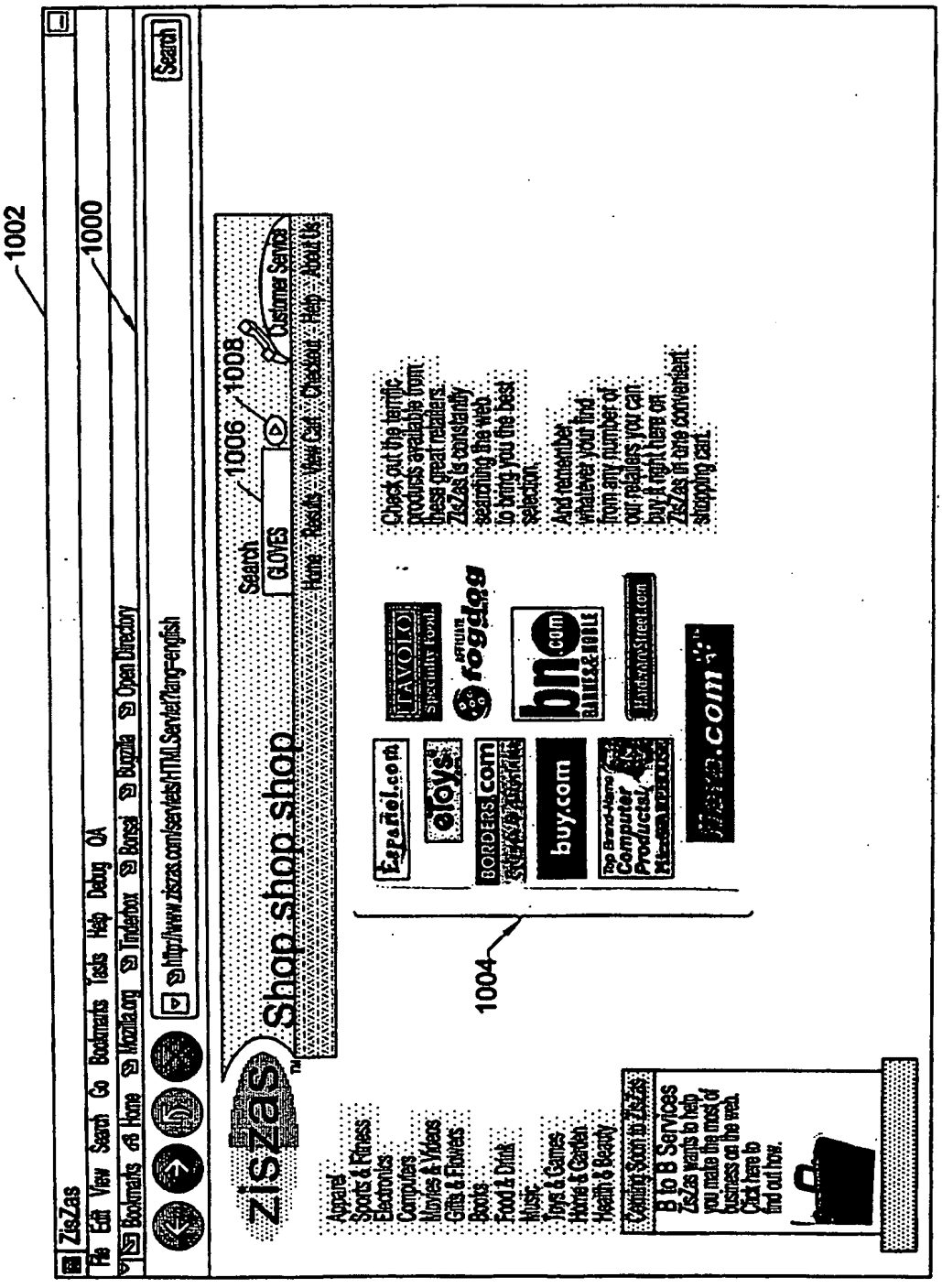

Netscape
File Edit View Go Window Help
Back Forward Reload Home Search Guide Print Security Stop
Search Results
Shopping Cart
Search Results for: printers
Stop Search
Loading Complete
printers
search
IMAGE
NAME
SITE
CATEG...
PRICE
INSTOCK
COLOR
DPI
PPM
MEMORY
BUY
PAGEWORKS 25 600DPI PAR 64MB 12PPM PC16 DUAL PROCESSORS POWER PC
BUY.COM
LASER
$1465.9...
YES
MONO...
600
25.0
8
COCOJPRINT P1202 PERSONAL LASER 12PPM 1200DPI PCL6 USB
BUY.COM
LASER
$545.96...
YES
MONO...
1,200
12.0
4
OPTRA COLOR 1200 LED 600DPI 12PPM 32MB A3 PAR PSL2 PCL5 6
BUY.COM
LASER
$4638.9...
YES
COLOR
600
12.0
32
PAGEWORKS 18N 600X1200DPI PAR 4MB 18PPM 10/100BT PCL6
BUY.COM
LASER
$1031.9...
YES
MONO...
1,200
18.0
4
PHASER 840 70PPM 32MB 1000DPI PAR ENET USB PSL3 PCL5C
BUY.COM
INKJET
$2317.9...
YES
COLOR
1,000
10.0
32
CATEGORY: All
INSTOCK: YES
MEMORY: 32
PRICE: $4638.00
DPI: 1200
Still Video Printers
Video
Accessories
85
86d
86e
86a
86b
86c
87a
87b
87c
87d
87e
87f
87g
87h
87i

FIG. 10.


1002
1000
1004
1006
1008
ZisZas
Shop shop shop
Search
GLOVES
Customer Service
Home Results View Cart Checkout Help About Us
Apparel
Sports & Fitness
Electronics
Computers
Movies & Videos
Gifts & Flowers
Books
Food & Drink
Music
Toys & Games
Home & Garden
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Coming Soon to ZisZas
B to B Services
ZisZas wants to help you make the most of business on the web. Click here to find out how.
Check out the terrific products available from these great retailers. ZisZas is constantly searching the web to bring you the best selection.
And remember whatever your find from any number of our retailers, you can buy it right there on ZisZas in one convenient shopping cart.
Español.com
eToys
BORDERS.com
buy.com
TAVOLO
Specialty Food
ragdog
bn.com
BARNES&NOBLE
HardwareStreet.com
Computer Products
.com

FIG. 11.

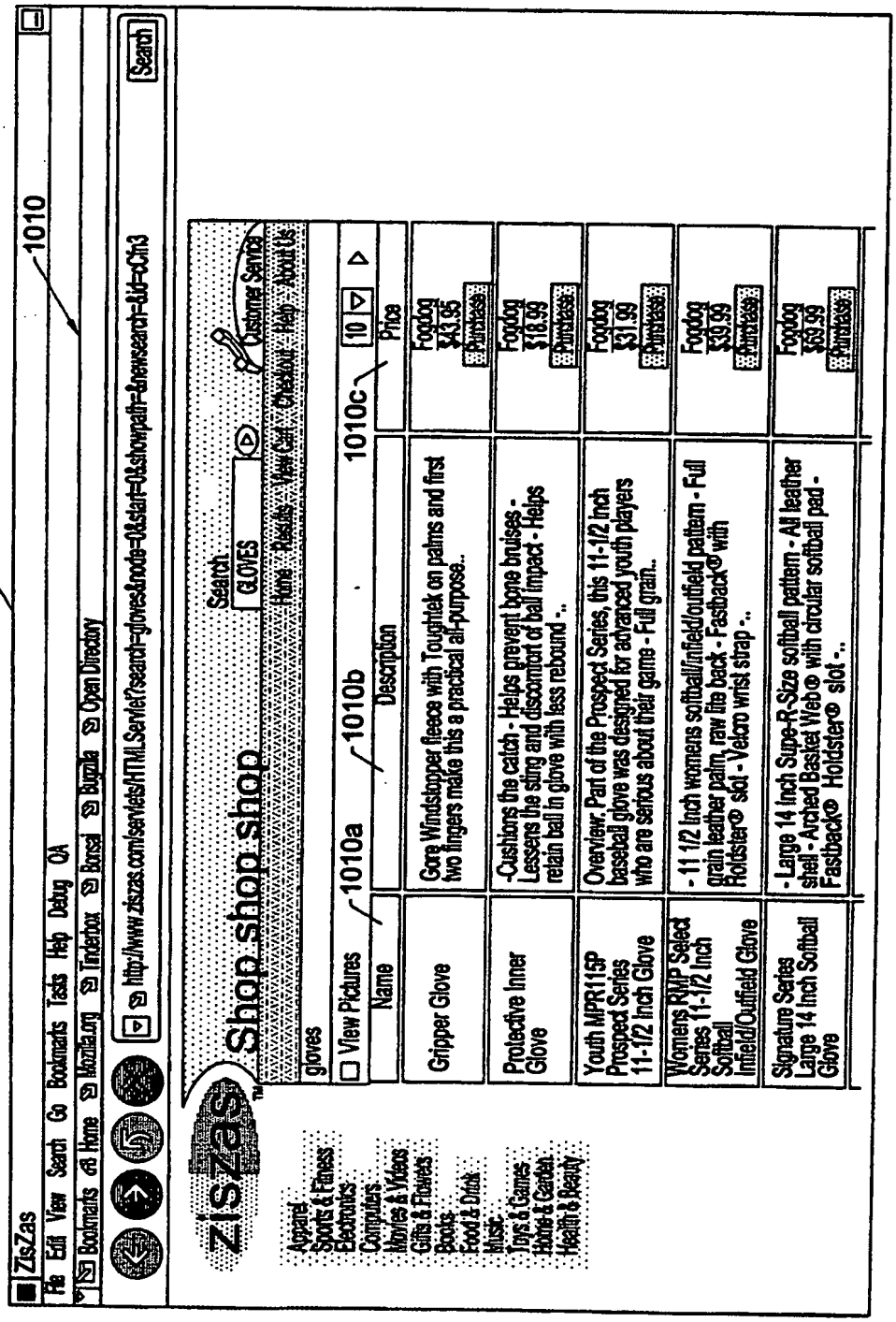
1002
1010
ZisZas
File Edit View Search Go Bookmarks Tasks Help Debug QA
Bookmarks Home Mozilla.org Tinderbox Bonsai Bugzilla Open Directory
http://www.ziszas.com/servlets/HTMLServlet?search=gloves&node=0&start=0&showpath=&newsearch=&id=Ch3
Search
ZisZas Shop shop shop
Search GLOVES Customer Service
Home Results View Cart Checkout Help About Us
Apparel
Sports & Fitness
Electronics
Computers
Movies & Videos
Gifts & Flowers
Books
Food & Drink
Music
Toys & Games
Home & Garden
Health & Beauty
gloves
View Pictures
1010a
1010b
1010c
10
Name
Description
Price
Gripper Glove
Gore Windstopper fleece with Toughtek on palms and first two fingers make this a practical all-purpose...
Foodog $43.95 Purchase
Protective Inner Glove
-Cushions the catch - Helps prevent bone bruises - Lessens the sting and discomfort of ball impact - Helps retain ball in glove with less rebound -..
Foodog $16.99 Purchase
Youth MPR115P Prospect Series 11-1/2 Inch Glove
Overview: Part of the Prospect Series, this 11-1/2 inch baseball glove was designed for advanced youth players who are serious about their game - Full grain..
Foodog $31.99 Purchase
Womens RMP Select Series 11-1/2 Inch Softball Infield/Outfield Glove
- 11 1/2 inch womens softball/infield/outfield pattern - Full grain leather palm, raw title back - Fastback® with Holdster® slot - Velcro wrist strap -..
Foodog $39.99 Purchase
Signature Series Large 14 Inch Softball Glove
- Large 14 inch Supe-R-Size softball pattern - All leather shell - Arched Basket Web® with circular softball pad - Fastback® Holdster® slot -..
Foodog $69.99 Purchase

FIG. 12.

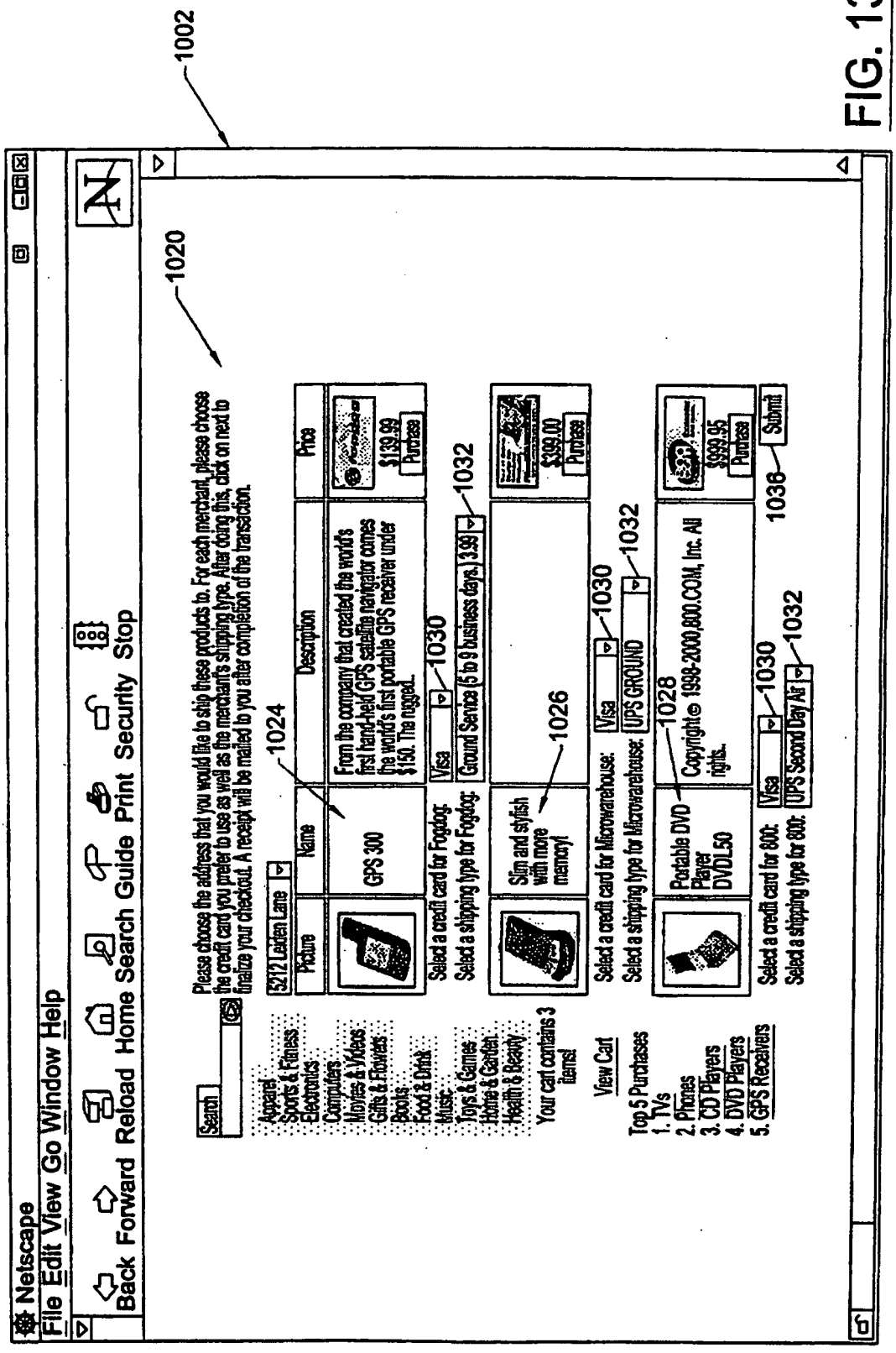
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FIG. 13.